

# **GROUND WATER MONITORING TECHNICAL MEMORANDUM NO. 1**

## **2012-2013 MONITORING RESULTS**

### **ATLANTIC RESEARCH CORPORATION RCRA CORRECTIVE ACTION SITE GAINESVILLE, VIRGINIA**

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## ACRONYMS

µg/L	micrograms per liter
µmol/L	micromoles per liter
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,3-DNB	1,3-dinitrobenzene
Alliance	Environmental Alliance, Inc.
AOPC	area of potential concern
AP	ammonium perchlorate
ARC	Atlantic Research Corporation
CA	chloroethane
cis-1,2-DCE	cis-1,2-dichloroethene
CO <sub>2</sub>	carbon dioxide
COCs	constituents of concern
DO	dissolved oxygen
DoD	Department of Defense
EISB	enhanced <i>in-situ</i> bioremediation
EVO	emulsified vegetable oil
ft	feet
GAC	granular activated carbon
Geosyntec	Geosyntec Consultants Inc.
gpd	gallons per day
gpm	gallons per minute
HMX	1,3,5,7-tetranitro-1,3,5,7-tetrazocane
IM	Interim Measure
kg	kilograms
L	liter
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
mV	millivolts
NDTS	Northern Deep Ground Water Treatment System
ORP	oxidation-reduction potential
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PMWs	performance monitoring wells
psi	pounds per square inch
QAPP	Quality Assurance Project Plan

RCRA	Resource Conservation and Recovery Act
RDX	1,3,5-trinitro-1,3,5-triazinane
RSL	Regional Screening Level
SVOCs	semi-volatile organic compounds
TCE	trichloroethene
TRC	TRC Environmental Corporation
TTU	thermal treatment unit
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOCs	volatile organic compounds

## **1.0 SUMMARY OF RESULTS**

This Ground Water Monitoring Technical Memorandum No. 1 summarizes the results of ground water and surface water monitoring at the Atlantic Research Corporation (ARC) RCRA Corrective Action Site in Gainesville, Virginia (Site) during 2012-2013, a period when the Site has been transitioning from significant soil and ground water source treatment actions to a longer-term operation and maintenance phase.

### **1.1 Summary of Objectives and Rationale of the Monitoring Program**

Ground water and surface water sampling activities were completed in 2012-2013 following a semi-annual sampling framework. The Site location is shown on Figure 1. The objectives of the sampling program over the reporting period included the following:

- Ground water monitoring associated with verifying the effectiveness of the operating pump and treat system was completed to continue to track concentrations of constituents of concern (COCs) over time to ensure that concentrations in and around, and immediately downgradient of the pumping well were not significantly changing.
- Ground water monitoring at the downgradient property boundaries to verify that COCs are not present at concentrations that exceed applicable United States Environmental Protection Agency (USEPA) risk-based screening levels for the Site.
- Ground water monitoring of wells positioned downgradient of the former Thermal Treatment Unit (TTU) to verify that concentrations of COCs were not significantly increasing over time.
- Surface water monitoring of perennial streams on the Site to verify that COC concentrations do not exceed risk-based screening levels at the Site boundary.

The majority of the monitoring wells and surface water collection points that were used to meet these objectives were sampled semi-annually during the reporting period; however, some locations that were deemed to be a secondary priority were sampled annually.

During the reporting period, it was recognized that the sampling program objectives presented above were sufficient and reasonable for the Site based on the following rationale:

- The completion of the Supplemental RCRA Facility Investigation (SRFI) in 2009 (Geosyntec, 2009b) eliminated the need to sample locations to further characterize the nature and extent of contamination in ground water beneath the Site.
- The removal of the Thermal Treatment Unit and several other major soil source and buried debris areas within the interior portion of the Site from 2011 to 2013 is likely to result in decreasing concentrations of COCs in ground water and surface water beneath the Site.

- The culmination of the enhanced ground water biodegradation treatment study at the Site in 2012 removed the need to monitor an extensive number of wells in and around the extraction well on the Site.
- The operation of the pump and treat system over the past 20 years has had a positive impact on stabilizing and reducing COC concentrations over time. Sampling results for the past several years indicate that concentrations of COCs from Site sources are not migrating to downgradient property locations at concentrations that exceed applicable USEPA risk-based screening criteria.

As a result of the above activities and observations, the monitoring program has transitioned into a longer-term operation and maintenance phase. There are currently an estimated 200+ monitoring wells on the Site that have been installed and monitored for various data collection objectives over the past 25 years. During the current reporting period, ARC sampled between 70 and 100 wells and surface water data points during semi-annual sampling events to meet the sampling program objectives presented above.

In addition, during this reporting period, the enhanced biodegradation treatment study initiated in 2009 was completed and discontinued in 2012. The effects of the treatment study were presented by ARC in the *2010 Annual Interim Measures (IM) Update Report* (2010 IM Update Report; Geosyntec, 2012a) and *2011 Annual Interim Measures (IM) Update Report* (2011 IM Update Report; Geosyntec, 2012d). The results will be used to support the preparation of the Proposed Remedy for the Site.

A summary of observations and findings for 2012-2013 monitoring activities are provided below, along with a monitoring plan for 2014 sampling activities. A detailed analysis of the sampling results including the presentation of figures, tables, graphs, and appendices are presented in the “Detailed Analysis” section of the Technical Memorandum.

## **1.2 Summary of Ground Water and Surface Water Monitoring Results**

As discussed in the Work Plan for 2011-2012 Ground Water Monitoring and Well Maintenance Activities (Geosyntec, 2011b), the ground water concentration data are compared to the following screening levels:

- MCLs (<http://water.epa.gov/drink/contaminants/index.cfm>) where specified; and
- USEPA regional screening levels (RSLs) ([http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/Generic\\_Tables/index.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm), accessed April 2012) – Tap Water Ingestion for COCs which do not have a specified MCL; the RSL screening value is the lower of the tap water ingestion criteria calculated at either the target cancer risk of  $10^{-5}$  or target hazard quotient of 1.

In addition, the surface water concentration data are compared to the following screening levels:

- Ambient Water Quality Criteria (AWQC) based upon the following hierarchy:
  - Chronic Virginia AWQC,
  - Acute Virginia AWQC,
  - USEPA Region 3 AWQC, and
  - USEPA Region 5 AWQC.
- Site-Specific Recreator Surface Water Contact Criteria

### **1.2.1 Site Boundary Wells**

Key Site boundary wells were sampled semi-annually to verify that COC concentrations were not detected above risk-based screening levels.

All eleven boundary wells and surface water sample locations had results below applicable USEPA screening levels except as noted below for deep well (DW) and shallow well (SW) locations:

- DW SB-01 and SW SB-01 results for manganese were 1.21 and 1.76 mg/L, respectively in 2012, which is above the screening level of 0.38 mg/L. However, these monitoring well results are consistent with prior results, which were attributed to naturally high levels in the bedrock since manganese was not handled on the Site (Geosyntec, 2011a).
- DW SB-02 and DW-12 results for 1,1-dichloroethene (1,1-DCE) ranged from 7 to 11 micrograms per Liter (ug/L), which is at or slightly above the MCL of 7 ug/L for 1,1-DCE (although it is noted that the current tap water RSL for 1,1-DCE is 262 ug/L) and are consistent with past results. The concentrations of 1,1-DCE at these two monitoring wells have been stable to decreasing since 2009. Additionally, the most recent results for 1,1,-DCE at BW 212-01 located near DW SB-02 and upgradient of the property boundary were 8 and 10 ug/L and are consistent with the stable to decreasing VOC trend toward the property boundary. The concentrations of all other COCs from Site sources detected at the eleven downgradient property boundary wells were below applicable risk-based screening levels, when detected. The 1,1-DCE results along the downgradient property boundary will again be verified during the Spring and Fall 2014 semi-annual sampling events.

### **1.2.2 Effectiveness of the Pump and Treat System and Deep Ground Water Conditions**

During the 2012-2013 reporting period, the pump and treat system generally operated according to specifications described in the 2011 IM Update Report (Geosyntec, 2012d) and overall is performing well, except for an electrical malfunction, which shut down the system from October to December 2013. The performance of the pump and treat system may be summarized as follows:

- At the beginning of 2013, the enhanced biodegradation treatment study was concluded and the results indicated favorable degradation of perchlorate to chloride and chlorinated solvents to ethene

and chloride in the area in and around the pumping well on the Site. Substrate consisting of vegetable oil is continuing to be injected into the system to promote biodegradation activity. As a result, some monitoring wells that were installed within the capture area and immediately downgradient of the pumping well were removed from the sampling program in 2013 since the sampling of these wells for treatment study purposes was no longer needed. This represented a shift of the operation of the pump and treat system from a treatment study to a longer-term on-going operation and maintenance phase including the emphasis of monitoring concentrations of COCs at the property boundary, and at key locations on the Site. The results of the enhanced biodegradation treatment study will be used by ARC in the development of the Proposed Remedy for the Site.

- COCs in deep ground water continue to be generally confined within the zone of hydraulic influence (i.e. “capture zone”) of the pump and treat system, consistent with past results (Geosyntec, 2011a, Figure 3). Concentrations of several COCs continue to decrease outside of the capture zone. Concentrations at the Site boundary continue to demonstrate that impacted ground water is not migrating off-Site above applicable screening levels (as indicated above, 1,1,-DCE in bedrock ground water at deep wells DW-12 and DW SB-02 exceeded the MCL, however these results are consistent with past results and do not indicate any significant migration of ground water off site at levels of concern).
- The majority of deep wells either did not have COC detections, or had detections that were below screening levels over the past three to five years. In the remaining wells, COC concentrations generally were either decreasing, stable or had no trend. Increasing trends were only observed in four wells, all located within the zone of hydraulic influence of the pump and treat system, including minimal increases of 1,1-DCA at three locations (DW-25, DW-26D, and DW-28D) and PCE at one location (DW-72A). Fluctuating COC concentrations over time within the capture zone are to be expected at monitoring wells as impacted water is drawn to the extraction well at variable rates and concentrations.

### **1.2.3 Shallow Ground Water (Including the Former TTU Area) and Surface Water**

- Semi-annual shallow ground water and surface water sampling was completed during 2012-2013. Similar to the deep ground water COC concentrations, the majority of COCs in the shallow ground water monitoring program continued to be either non-detect or below screening levels. There were no detections of COCs above screening levels in shallow ground water or surface water at the downgradient property boundary during the 2012-2013 reporting period, except as noted above for manganese at one location.
- In monitoring wells within the interior portion of the Site located upgradient of the downgradient property boundary, COC concentrations generally were either decreasing, stable or had no trend. With the completion of the Soil Interim Measures program in 2013 that removed approximately 20,000 cubic yards of impacted soil and debris that exceeded commercial/industrial risks of concern, it is expected that COC concentrations in shallow ground water located beneath the interior portion of the Site will continue to decrease over time.

- COCs with increasing trends were observed at four interior wells located upgradient of the downgradient property boundary. Increasing trends were observed at BW 79-02S (1,1,1-TCA, 1,1-DCE, and 1,1-DCA), BW 45-03S (cis-1,2-DCE and VC), SW 15-02 (PCE and TCE), and BW 28-02S (PCE). The concentrations of COCs in these wells will continue to be monitored during future events to verify that the trends begin to stabilize as a result of the completion of the Soil IM program.
- In general, elevated concentrations of COCs in shallow ground water are present downgradient of former soil source areas that have been removed over the past two years, such as the TTU (perchlorate and RDX), the corridor between Buildings 5 and 15 (1,1,1-TCA, 1,1-DCE, PCE), and Building 40 (PCE) area. The elevated concentrations decrease along flow paths in a south to southeasterly direction towards the downgradient property boundary.
- Wells near and downgradient of the TTU typically showed stable to decreasing concentrations of COCs during the reporting period. Wells further downgradient within the core of the plume that originates from the TTU also typically showed stable to decreasing concentrations of COCs. Wells near and west of the TTU exhibited transient spikes in perchlorate concentrations in either November 2012 or May 2013; however, similar spikes have not been observed in wells further downgradient, which continue to exhibit decreasing perchlorate concentrations. These observations may be the result of the removal of perchlorate impacted soil beneath and around the TTU in 2011 and 2012.
- Sampling for 1,4-dioxane was completed per USEPA requirement using the more sensitive method of SW-846 8270D SIM. Low level detections of 1,4-dioxane were observed at several interior well locations; however, only two of these locations (SW 15-02 and BW 28-02S) exceeded the RSL of 6.7 µg/L (tapwater ingestion value with a cancer risk of 10<sup>-5</sup>). Neither of these wells are located near the downgradient Site boundary.
- Surface water location West 01 near the TTU had an elevated concentration of perchlorate in May 2013, possibly a byproduct of source excavation in the area; however, this result appears to be stable or no-trend at this time. Additional sampling will be continued in the future to determine any potential trends.

### **1.3 Activities Planned for 2014**

The following ground water and surface water management activities will be conducted in 2014 to meet the overall objectives presented above:

- Continue operation of the pump and treat system in its current configuration and operating rates. Monitor system pressures and injection rates for evidence of bio-fouling or other issues, and take corrective action as required. As part of the Proposed Remedy for the Site, ARC will initiate a plan to design and construct a new ground water extraction and treatment system to replace the existing system.

- Continue sampling pump and treat system performance monitoring wells to verify the effectiveness of the extraction system, as noted in Table 9. This will include continued monitoring of key wells located downgradient of the former TTU.
- Complete annual and semi-annual sampling of deep and shallow ground water and surface water to verify that concentrations of COCs do not exceed risk-based screening levels for the Site, as noted in Table 10.
- ARC will initiate the completion of a monitoring well abandonment work plan that will be prepared and implemented as an update to the 2011 plan (Geosyntec, 2011b).

## **2.0 DETAILED ANALYSIS**

### **2.1 Data Quality**

Procedural activities were conducted to verify that data collected during the monitoring period meet project quality control/quality assurance objectives for the Site. Sampling was performed according to the Quality Assurance Project Plan (QAPP) provided in Appendix E of the IM Work Plan (Geosyntec, 2009a) and Appendix B of the Supplemental RCRA Facility Investigation Report (Geosyntec, 2009b). Data validation was conducted on all data collected by Geosyntec or TRC.

No significant issues with data quality were encountered in any of the aforementioned checks, and all data collected are appropriate for use in the ground water and surface water monitoring program. Additional information on the laboratory and field audits as well as data validation reports are provided in **Appendix E**.

### **2.2 Deep Ground Water Monitoring**

#### **2.2.1 Performance Objectives of the Pump and Treat System**

As described in the 2009 IM Update Report, the performance objectives of the enhanced biodegradation ground water pump and treat system are:

- Reliable operation of the system;
- Achievement of substantial degradation of COCs in the deep aquifer to environmentally acceptable end products such as ethene, ethane and chloride; and
- Achievement of sufficient containment to mitigate migration of COCs from the deep ground water source area and prevent off-site migration of COCs in the deep aquifer.

As part of transitioning from significant soil and ground water source treatment actions to a longer-term operation and maintenance phase, these objectives will be updated by ARC in preparing the proposed remedy for the Site.

### 2.2.2 Summary of Findings

During the 2012-2013 reporting period, the pump and treat system generally operated according to specifications described in the previous IM Update Reports, as summarized on graphs presented in **Appendices A, B and C**. Sample data for property boundary wells are provided in Table 1, and interior Site locations are provided in Table 2. Additionally, Deep Ground Water Well Time Trend Charts are provided in Appendix B. The ground water pump and treat system performance may be summarized as follows:

- Biodegradation of perchlorate to chloride and chlorinated solvents to ethene and chloride was demonstrated for deeper bedrock ground water in the 2011 IM Update Report. As a result, the enhanced biodegradation treatment study was completed in 2012 and the results will be used to evaluate the design and construction of a new extraction system on the Site as part of the Proposed Remedy.
- The pump and treat system operated during the majority of 2012 and 2013. A period of down time was experienced from October 2013 to December 2013 due to electrical problems. After significant troubleshooting and maintenance the system was restored to operation on December 20, 2013.
- COCs in deep ground water continued to be generally confined within the zone of hydraulic influence of the extraction well (Geosyntec, 2011a, Figure 3). Concentrations of several COCs continued to be generally stable or decreasing across the Site during the reporting period. Concentrations at the Site boundary continue to demonstrate that impacted ground water is not migrating off-Site above applicable risk-based screening levels, with the limited exception of 1,1,-DCE in bedrock ground water at DW-12 and DW SB-02 where concentrations slightly exceeded the MCL, but are below the current RSL. These results at DW-12 and DW SB-02 are consistent with past results and do not indicate any significant migration of ground water off site at levels of concern (GeoSyntec, 2012a; 2012d).
- The majority of deep wells either did not have COC detections, or had detections that were below screening levels. In the remaining wells, COC concentrations generally were either decreasing, stable or had no trend. Increasing trends were only observed in four wells, all located within the zone of hydraulic influence of the treatment system, including minimal increases of 1,1-DCA at three locations (DW-25, DW-26D, and DW-28D) and PCE at one location (DW-72A). These fluctuations are expected to occur over time within the capture zone of the extraction well.
- Overall, the pump and treat system continued to be effective during the reporting period.

### 2.2.3 Operating Effectiveness of the Pump and Treat System

The current configuration of the pump and treat system, often referred to in past as the Northern Deep Treatment System (NDTS), is illustrated in Figure 2. Ground water is extracted from well DW-13 and then passes through a bag filter and a granular activated carbon (GAC) unit prior to collecting in an equalization tank. From the equalization tank, the ground water is amended with EVO (an electron donor that stimulates growth of microorganisms and biodegradation of the COCs), and then re-injected into well

IW-8 under pressure. While partial removal of VOCs is achieved *ex situ* with the GAC unit (primarily the higher sorbing constituents such as tetrachloroethene [PCE] and trichloroethene [TCE]), the primary treatment mechanism is through degradation of the COCs (primarily perchlorate and VOCs including PCE, 1,1,1-TCA, 1,1-DCE, 1,1-DCA, and VC) in the ground water *in situ*. The following observations were made regarding the operation of the NDTS during the reporting period:

- The ground water amendments were changed as part of concluding the treatment study in 2013. In general, prior to 2012 the NDTS operated with lactate, during 2012 the NDTS operated with both lactate and EVO, and during 2013 EVO was used. EVO continues to be used as an enhancement to ground water treatment.
- The NDTS operated for the majority of 2012-2013 with continual extraction of ground water from DW-13 and reinjection into IW-8 at a rate of 55 to 70 gpm, amendment of a 60% sodium lactate solution at a rate up to 38 gallons per day (gpd) during early 2012, amendment of both lactate and EVO at rates up to 43 gpd later in 2012, amendment of EVO only during 2013 at rates up to 14 gpd, and system pressures below 100 pounds per square inch [psi]). Table 8 provides a summary of system operation throughout the reporting period, including injection and extraction rates, dates and reasons for system shutdowns, and electron donor amendments. As seen on Figure 2, ground water was extracted from DW-13 and re-injected into IW-8. As seen on Figures 7 and 8, system pressures at various points within the *ex situ* infrastructure were maintained below specified maximum criteria. Figure 2 illustrates the location of each of the pressure gauges within the system infrastructure.

#### **2.2.4 Ground Water Monitoring of the Effectiveness of the Pump and Treat System**

Sampling of NDTS Performance Monitoring Wells (PMWs); consisting of extraction well DW-13, DW-22, DW-28DD, DW-29I/D, DW-35 Zones 5 and 8, DW-36D/DD, and DW-72B) was conducted in 2012 and 2013 (**Table 7**). Monitoring included sampling of VOCs, perchlorate, and other performance indicators. In addition to sampling of the PMWs, other deep ground water wells are sampled for deep ground water plume monitoring. These locations are shown in **Figure 3**.

PMWs were sampled for the following parameters:

- Parent COCs (e.g., PCE, 1,1,1-TCA and perchlorate);
- Daughter products of biodegradation (e.g., 1,1-DCE, 1,1-DCA, TCE, cis-1,2-DCE, VC, ethene, ethane, chloride);
- Field parameters to monitor redox changes (e.g., DO and ORP); and
- Secondary ground water parameters manganese and methane.

Additionally, several deep ground water wells on Site were sampled to confirm: (i) containment of migration of COCs from the deep ground water source area; and (ii) that off-site migration of COCs above screening levels in the deep aquifer did not occur during 2012-2013.

Results of the performance monitoring provide multiple lines of evidence that the system is effective at meeting its intended objectives. Below is a discussion of the sampling data that was collected during the reporting period to verify the effectiveness of the system.

This summary also serves as documentation of the primary results of the treatment study, which will be used by ARC during the preparation of the Remedial Plan for the Site. As discussed above, the treatment study was completed in 2012. For 2013 and beyond, the level and degree of sampling that was done as part of the treatment study was not, and will not be done in the future at the Site moves into an operational and maintenance phase. EVO continued to be used in 2013, and will continue into 2014 based on the favorable treatment study results presented below. Analytical data for sampling of treatment system monitoring wells in 2012-2013 are provided in **Table 7**.

#### **2.2.4.1 Parent COCs Reduction and Daughter Production**

Concentration trends observed in PMWs are shown in **Figures A.1 to A.10** in **Appendix A**. The table below summarizes concentration trends for perchlorate, 1,1,1-TCA, and 1,1-DCE and their respective degradation products (chloride, 1,1-DCA and chloroethane, and VC and ethene) between the point of injection (IW-8) and the nearest PMWs, DW-35 (zones 5 and 8) and DW-36D/DD. Prior reports have indicated that wells DW-35 (zones 5 and 8) and DW-36D/DD are highly connected to injection well IW-8 with short travel times between injection and monitoring wells (less than 6 days).

As seen in this table, the concentrations of perchlorate, 1,1,1-TCA and 1,1-DCE all continued during the reporting period to experience reductions in concentrations, and concentrations of their respective degradation products chloride, 1,1-DCA and chloroethane, and VC and ethene were all observed to increase with distance from the injection point, as expected. As seen on the time trend plots provided in **Figures A.1 to A.10**, the rate of VC production due to biodegradation of 1,1-DCE is now lower than the rate of VC biodegradation resulting in a net decrease in VC with distance downgradient to the vicinity of DW-28DD. VC concentrations appear to be generally stable at PMWs DW-28DD, DW-72B, the extraction well DW-13, and other monitoring wells within the zone of pumping influence.

Concentrations of 1,1-DCA remained stable or decreased in 2013 in the PMWs. Significant reductions of 1,1-DCE and perchlorate, and increases in ethene production near the end of 2011 were also observed in 2012-2013, suggesting continued biodegradation of 1,1,1-TCA, 1,1-DCE, perchlorate and VC. Increasing levels of chloroethane were also detected in several wells in 2012-2013 (including DW-36D, DW-36DD, DW-29I/D, DW-28D, and DW-22; ranging from 1 to 38 µg/L). Increasing production of chloroethane and decreasing 1,1-DCA concentrations suggest increasing 1,1-DCA degradation during 2012-2013 reporting period.

Constituent	Injected Concentration (IW-8; µg/L) <sup>2</sup>			PMW Concentration (DW-35/DW-36; µg/L) <sup>1</sup>		
	Minimum	Maximum	Median	Minimum	Maximum	Median
Perchlorate	500	3,000	2,300	< 0.2	900	<0.3
Chloride	7,700	15,700	11,700	13,000	17,900	16,500
1,1,1-TCA	50	100	57	<0.8	58	2
1,1-DCA	33	46	38	5	100	64
Chloroethane	< 1	< 1	< 1	< 1	38	4
1,1-DCE	130	230	150	< 0.8	150	<0.8
VC	3	4	3	< 1	24	7
Ethene	1.4	3.3	2.1	1.6	26	19

<sup>1</sup> Includes DW-35 zones 5 and 8, and DW-36D/DD.

<sup>2</sup> DW-13 concentrations represent a surrogate for IW-8

In extraction well DW-13, concentrations of parent products continued to generally decrease since treatment system modifications in 2009, with the exception of a spike in PCE, 1,1,1-TCA, and 1,1-DCE concentrations in November 2012. This decrease suggests depletion of source mass and reduced mass flux from source areas into ground water as bioremediation continues.

#### 2.2.4.2 Spatial Distribution of COCs in Deeper Ground Water Zones

The effectiveness of the pump and treat system on COC concentrations in deeper bedrock ground water was evaluated through assessing changes in the spatial distribution of COCs and temporal trends in individual wells (**Section 2.2.4.3**).

Analytical data for deep ground water zone wells and boundary wells are provided in **Table 1**. Time trend plots illustrating concentration changes over time of primary COCs and their degradation daughter products in deep ground water and downgradient property boundary monitoring wells are provided in **Appendices A and B**.

Geosyntec provided plan view figures in **Appendix E** of the 2011 IM report to illustrate the 2011 concentrations of key COCs across the Site. These figures characterized sampling results relative to the COC screening levels by color coding whether the results were non-detect, less than the screening level, or greater than the screening within increasing orders of magnitude. The 2012-2013 sampling data have been compared with the data presented on the 2011 figures to evaluate changes in spatial distribution, if any. Additionally, **Figure E.1** from the 2011 IM report shows a cross-section along the plume between DW-6 and DW-12 to indicate the depths at which samples shown on the plan view maps were collected. Key observations from these comparisons are as follows:

- In general, concentrations of COCs are stable or decreasing across the Site. Few changes would be necessary to update the 2011 figures and none of the changes would be considered significant. In

comparison to the 2011 figures, order of magnitude category decreases were observed at a few locations, primarily for parent chemicals. For example, 1,1,1-TCA no longer exceeds its screening level at DW-28I. PCE decreased an order of magnitude category at DW-26I (i.e., decreased below 500 ug/L) and DW-28I (i.e., decreased below 50 ug/L). Perchlorate decreased below screening levels at DW-16. One slight increase was observed for PCE at IW-6, which increased above its screening level; however, this is within an active treatment cell where transient increases and decreases may be expected.

- The majority of ground water containing COC concentrations exceeding screening levels is confined to the area within the zone of hydraulic influence of the NDTs, which according to Geosyntec encompasses the area bounded by DW 68-01 to the west, east beyond Building 121, and south to the vicinity of Buildings 40/45 (see 2009 IM update report; Geosyntec, 2010a).
- The vast majority of ground water outside of the influence of the treatment zone showed no detection of COCs, or estimated concentrations well below screening levels. Two exceptions consisted of a few locations with detections of 1,1-DCE and manganese. 1,1-DCE was detected at DW SB-02 at decreasing concentrations (range 11 to 8 ug/L) slightly above the screening level during each sampling event, and at DW-12 decreasing from slightly above to the screening level (range 8 to 7 ug/L). These detections are consistent with prior sampling results since 2009. Manganese was detected slightly above the screening level in May 2012 at DW-SB-01 and SW-SB-01. These monitoring well results are consistent with prior results, which has been attributed to naturally high levels in the bedrock, since manganese was not handled on Site Geosyntec (2011a).
- Other COCs were not detected, or detected at very low or estimated concentrations well below screening levels. These other detected COCs include parent COCs (e.g., PCE, 1,1,1-TCA and perchlorate) and daughter products of biodegradation (e.g., TCE, cis-1,2-DCE, VC, and 1,1-DCA). Table 1 summarizes these results.
- Sampling for 1,4-dioxane was completed per USEPA requirement using the more sensitive method of SW-846 8270D SIM. Generally low level detections of 1,4-dioxane were observed at several locations; however, only a few of these (DW-13, DW-23, DW-28S, DW-30I, DW-30D, DW-32I, DW-72B, and DW 76-01) exceeded the screening level of 6.7 µg/L. None were located near the Site downgradient property boundary.

#### **2.2.4.3 Temporal Trends in Deeper Ground Water Zones**

Significant attenuation of the COCs in deeper bedrock ground water zones has been observed over time, as seen in the time trend plots in **Appendix B**.

- Parent contaminants (perchlorates, PCE, and 1,1,1-TCA) continued to decrease or remain stable in concentration outside of the NDTs area. The highest remaining concentrations of perchlorates (BW 78-12D, DW-13, DW-28I, DW-29S, DW 76-01, and IW-6), PCE (DW-13, DW-24, DW-26I, and DW-72A), and 1,1,1-TCA (DW-13, DW-23, DW-32I, DW-35 Zone 8, DW-36DD, and DW 76-01) are present within the area of influence of NDTs capture at DW-13. Because of capture at DW-13

and re-injection at IW-8, the concentrations of perchlorates, PCE, and 1,1,1-TCA in some of the wells noted above have fluctuated.

- Degradation byproducts (1,1-DCA, 1,1-DCE, and VC) of the parent contaminants generally remained stable or decreased in concentrations outside of the NDTs area during the reporting period. Concentrations of 1,1-DCA were generally well below screening levels both outside and within the NDTs area. The highest remaining concentrations of 1,1-DCA, 1,1-DCE, and VC exceed screening levels and occur at the northwestern part of the area of influence of NDTs capture (DW-32I and DW-72B) and at DW 76-01 (1,1-DCE only) to the northeast of DW-13. Within the NDTs area of influence, the highest remaining concentrations of 1,1-DCE (DW-13, DW-23, DW-26I, DW-28I, DW-28D, DW-30I, DW-30D, DW-36DD, and DW-72A) and VC (DW-30I, DW-36D, DW-36DD, and IW-6) are generally decreasing or stable at concentrations above screening levels.
- Consistent with prior monitoring reports, concentrations at NDTs extraction well DW-13 have remained fairly stable over the past two decades with the influx of ground water contamination from upgradient portions of the property within the area of influence.
- Consistent with prior monitoring reports, wells having direct hydraulic connection to IW-8 (including DW-35 zones 3 to 8, DW-36D/DD, DW-29I/D, DW-28DD, DW-22 and DW-72B) generally show reductions in parent product concentrations coupled with transient increases of VC and 1,1-DCE. Stable to decreasing concentrations of 1,1-DCA were observed during the reporting period, as discussed in Section 2.3.3; see **Figures A.2, A.4, A.10, B.11, B.15, B.18** and others for examples of this.
- Concentrations in DW-20 and DW-12, located between the NDTs and downgradient property boundary, continued to be stable to decreasing during the reporting period. 1,1-DCE is present at DW-20 above screening levels and has decreased to the screening level at DW-12. Other COCs are below screening levels; see **Figures B.7 and B.14**. Concentrations had been variable during the 2002 to 2007 time period as a result of NDTs operational changes (two significant shutdown periods and reduced recirculation rates, which adversely impacted hydraulic capture during this period, as discussed in the *Evaluation of Potential for Off-Site Migration of Contaminants in Ground Water and Surface Water* letter submitted to USEPA on 23 December 2011 [Geosyntec 2011a]).

Within the vicinity of the deep ground water source area (generally bounded by Buildings 107 to the west, 78 to the east, and 70/76 to the south), ground water concentrations at shallower depths in the bedrock in particular have reduced significantly over the past several years. For example, in monitoring wells DW-28S and DW-29S within the NDTs recirculation area, perchlorate concentrations have reduced from historic maxima of approximately 46 and 1,600 mg/L in the 2004 to 2007 timeframe to concentrations below 1 and below 200 mg/L respectively in the 2009 to 2013 timeframe (**Figures B.24 and B.27**). In these same wells, other COCs such as PCE, 1,1,1-TCA, 1,1-DCE and 1,1-DCA have also reduced substantially to either below or near detection limits. This is an indication of degradation and the reduced influx of mass from deep ground water source areas, which will result in further reductions in ground water concentrations over time.

### 2.2.5 2014 Sampling Plan

As indicated by Geosyntec (2012d), biodegradation rates have stabilized over the past three years as evidenced by sustained reductions of perchlorate, 1,1-DCE, 1,1,1-TCA, and VC concentrations to below or near detection limits in wells downgradient of the injection well. Therefore, reduced sampling frequency/locations would be implemented to monitor the pump and treat performance going forward as the monitoring program transitions from a treatment study phase to the current operation and maintenance phase.

Deep ground water sampling results for 2012-2013 are generally consistent with findings from 2010-2011, and continue to indicate that natural attenuation is occurring downgradient of the pump and treat system and that there is no significant off-site migration of COCs above applicable risk-based screening levels.

Continued monitoring is recommended for 2014-2015 as shown in Tables 9 and 10. The site-wide deep ground water sampling program was re-evaluated and changes were made to remove unnecessary monitoring wells and/or analytes from the monitoring program, particularly those that have shown stable or decreasing concentrations. This removal includes well that have been below screening levels for a minimum three year period. The revised sampling program focuses on monitoring of the property boundary, monitoring of the pump and treat system performance, and monitoring of other key locations and source areas throughout the Site to confirm stability and continued attenuation of the plume. The revised 2014 sampling plan for the NDTs system monitoring is provided on Table 9 and plume and Site boundary monitoring is provided in Table 10.

## 2.3 Shallow Ground Water and Surface Water Monitoring

Operation of the enhanced *in-situ* bioremediation (EISB) shallow ground water IM was terminated per the USEPA approved IM Work Plan on 19 January 2009, as natural attenuation within the shallow aquifer appears to result in reduction in COC concentrations to below screening levels prior to migration in ground water from the Site.

The shallow ground water activities conducted in 2012 and 2013 included shallow annual and semi-annual sampling. Ground water samples were collected using low-flow sampling techniques, where possible, with a submersible pump or dedicated bladder pump in accordance with the QAPP (Geosyntec, 2009a; 2009b).

### 2.3.1 Findings of the Shallow Ground Water and Surface Water Monitoring

Time trends showing concentration changes of COCs in key monitoring wells and surface water locations are provided in **Appendix C**. Analytical data from the sampling events conducted in 2012-2013 for shallow ground water and surface water are provided in **Tables 3, 4, 5, and 6**. **Figure 4** shows the

location of all shallow ground water wells sampled on Site during the reporting period. **Figure 5** shows the surface water sampling locations.

In general, concentrations in shallow ground water are highest downgradient of known source areas that were removed through soil excavation interim measures over the last three years, such as the TTU (perchlorate and RDX), the corridor between Buildings 5 and 15 (1,1,1-TCA, 1,1-DCE), and Building 40 (PCE), but concentrations decrease along flow paths in a south to southeasterly direction along the core of the plume and are non-detect or just above detection limits at the Site boundary (see **Figures C.1 to C.33 in Appendix C**). As discussed below, it is expected that concentrations of COCs in shallow ground water will continue to decrease over time due to the removal of the major soil source and buried debris areas on the Site.

Sampling for 1,4-dioxane was completed per USEPA requirement using the more sensitive method of SW-846 8270D SIM. As seen on **Table 3**, low level detections of 1,4-dioxane were observed at numerous locations; however, only two of these (SW 15-02 and BW 28-02S) exceeded the RSL of 6.7 µg/L. These locations are not were near the downgradient Site boundary.

The time trend plots provided in **Appendix C** show that the reducing concentration trends noted in the 2009 IM Update Report (Geosyntec, 2010a) have generally continued through 2013. Concentration trends, observed in time trend plots, within the core of the plume originating from near the former TTU and other downgradient sources include the following:

- Wells near and downgradient of the TTU (BW TTU-02D, BW TTU-03D, SW 105-03D; **Figures C.18, C.31, and C.9 in Appendix C**) typically showed stable to decreasing concentrations of COCs during the reporting period. Wells further downgradient within the core of the plume that originates from the TTU (BW 14-02S, BW 16-04D, BW 28-02S and BW 28-04D; **Figures C.1, C.2, C.5, and B.6**) typically showed stable to decreasing concentrations of COCs, with a possible transient exception of PCE at BW 28-02S, which nevertheless remains intermediate in concentration between upgradient BW 16-04D and downgradient BW 28-04D. Wells near and west of the TTU (SW TTU-03, BW CG-01D, and BW TTU-05; **Figures C.21, C.26 and C.19**; Tables 3 and 6) exhibited transient spikes in perchlorate concentrations in November 2012 or May 2013; however, similar spikes have not been observed in wells further downgradient (BW 34-01, BW 31-01S, and BW 21-04D; **Figures C.7, C.32 and C.33**), which continue to exhibit decreasing perchlorate concentrations (Table 3).
- Wells near and downgradient of the Building 5 source area (SW 5-04, BW 5-05S, and SW 15-02; **Figures C.17, C.8 and C.10**) show stable to decreasing 1,1,1-TCA concentration trends with transient spikes, consistent with an attenuating soil source. These wells also demonstrate an order of magnitude decrease in 1,1,1-TCA concentrations over the 240 ft (feet) distance between SW 5-04 and SW 15-02, indicating attenuation of 1,1,1-TCA with distance from the source area. Other COCs generally show stable to decreasing concentrations trends.

- Wells near and downgradient of the Building 40 source area (SW 40-07A, SW 40-06, and SW 40-57; **Figures C.12, C.13, and C.14**) have generally shown stable to declining trends in PCE and other COC concentrations over the past six years.
- Well SW 46-01, downgradient of minor soil impacts detected near Building 46, also has shown stable to decreasing concentrations in PCE, TCE, 1,1-DCE, and perchlorate since the mid-1990s (**Figure C.16**).
- In the Research and Development area (BW 212-01), low concentrations of 1,1-DCE, 1,1-DCA, and TCE continue to be detected either below or just above screening levels. As seen on **Figure C.4**, concentrations have decreased in BW 212-01 since the first sampling round in 2008.
- As indicated by Geosyntec (2012d), the majority of the well/analyte combinations in the shallow ground water monitoring program were either non-detect or below screening levels for 2009-2011 (Geosyntec, 2012d; **Table 2-6**). The remainder of the wells/analyte combinations primarily exhibited stable or decreasing trends. Results for 2012-2013 are consistent with this conclusion.

At and near of the downgradient Site boundary, the following trends were observed:

- None of the wells located along the Site boundary (SW SB-01, SW SB-02, SW SB-03, SW PBS-01, SW 222-02, SW 212-01, and SW 200-02; **Table 1**) have detections of any COCs exceeding screening levels, except for manganese at SW SB-01, which has been attributed to background conditions (GeoSyntec, 2011a).
- Wells within 500 feet upgradient of the site boundary (SW 47-02, SW 28-41, BW 225-01, BW 212-01, and SW 47-05) generally show decreasing to stable concentrations of perchlorates, PCE, and TCE above screening levels nearer to the site boundary. Other COCs are below screening values. SW 28-41 (located approximately 230 feet upgradient of the site boundary) has exhibited downward trends in concentrations of all VOCs since the early 1990s, and perchlorates appear stable (**Figure 4 and Figure C.11**).
- Upgradient of the Site boundary at surface water location STR 40-15 (**Figure C.25**), the concentration of perchlorate, which had demonstrated a downward trend since 2004, increased slightly. Concentrations of PCE, TCE, and cis-1,2-DCE at this location spiked similar to an occurrence in 2009, but at much lower concentrations in 2013. All other COCs were below screening levels or non-detect.
- At site boundary surface water locations STR-02 (**Figure C.22**) and STR-04 (**Figure C.23**), concentrations of VOCs have been non-detect or below screening levels for the last decade and detected concentrations have remained stable. Although perchlorate at STR-04 is considered stable, it has fluctuated above and below the screening level.

### 2.3.2 2014 Sampling Plan

Ground water and surface water sampling results for 2012-2013 are generally consistent with findings from 2010-2011, and continue to indicate that natural attenuation is occurring and that there is no significant off-site migration of COCs.

Continued monitoring is recommended for 2014 as shown in **Table 10**. The site-wide shallow ground water sampling program was re-evaluated and changes were made to remove wells and/or analytes from the sampling program for which concentrations have been below screening levels for a minimum three year period. Sampling frequencies were also modified as necessary to meet the criteria outlined in **Figure 11**.

TTU monitoring wells will continue to be monitored on a semi-annual frequency through 2014, per agreement with the Virginia Department of Environmental Quality, to complete the required four rounds of semi-annual sampling post excavation, and the sampling program will then be re-evaluated.

Findings from the sampling will be summarized in the 2014 Technical Memorandum Update Report and recommendations for future sampling will also be provided at that time.

## 3.0 SUMMARY

As described in the previous sections of this report, the ground water pump and treat system continues to meet the objectives outlined in the 2009 IM Assessment Work Plan (Geosyntec, 2009a). Concentrations of parent COCs in deep ground water within the active recirculation area of the NDTS are steadily decreasing, with transient increases of daughter products observed since 2010 followed by reductions to near detection limits, as expected with bioremediation treatment. 1,1-DCA, concentrations increased slightly from 2010 to 2012, but have more recently stabilized in many of the treatment system performance monitoring wells, indicating slower biodegradation of this constituent; however, concentrations remain below screening levels at the majority of locations and at the Site Boundary.

Monitoring of concentrations in deep ground water outside of the treatment zone and at the downgradient Site boundary indicate that the modified NDTS system has been successful at achieving hydraulic capture and reducing concentrations downgradient of the pump and treat system. Migration of COCs above applicable USEPA screening levels across the southern Site boundary continues to be prevented through operation of the NDTS, with the limited exception of 1,1,-DCE in bedrock ground water at DW-12 and DW SB-02, which have been at or within 1 to 4 ug/L above the MCL screening level during the reporting period and since 2009, but well below the risk-based RSL for this constituent.

Monitoring of natural attenuation in shallow ground water continues to demonstrate stable and decreasing trends, and that migration of COCs across the Site boundary at concentrations above screening levels is not occurring.

The following monitoring activities will be completed for 2014:

- Continue operation of the NDTs in its current configuration and operating rates. Monitor system pressures and injection rates for evidence of bio fouling or other issues, and take corrective action as required.
- Continue sampling NDTs performance monitoring wells, but with a revised sampling frequency as noted in **Table 9**.
- Complete annual and semi-annual sampling of deep and shallow ground water and surface water, but with a revised sampling frequency as noted in **Table 10**.
- Pending overall project progress, the operation of the NDTs will be reviewed and planning will begin for replacement of the NDTs as part of ARC'.
- Pending overall project progress, a monitoring well abandonment work plan will be prepared and implemented as an update to the 2011 plan (Geosyntec, 2011b).

#### **4.0 REFERENCES**

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Waller, A.D, E. Cox, and E. Edwards, 2004, "Perchlorate-Reducing Organisms Isolated from Contaminated Sites," Environmental Microbiology (2004): 6 (5), 517–527.

## FIGURES

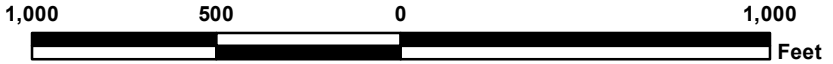


Sources: Esri, DeLorme, HERE, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri



**Site Features**

- Site Boundary
- Paved Road
- Unpaved Road
- Pavement
- Parking
- Railroad Track
- Tank
- Building
- Former Building
- High Pressure Gas line
- Perennial Surface Water
- Ephemeral Surface Water

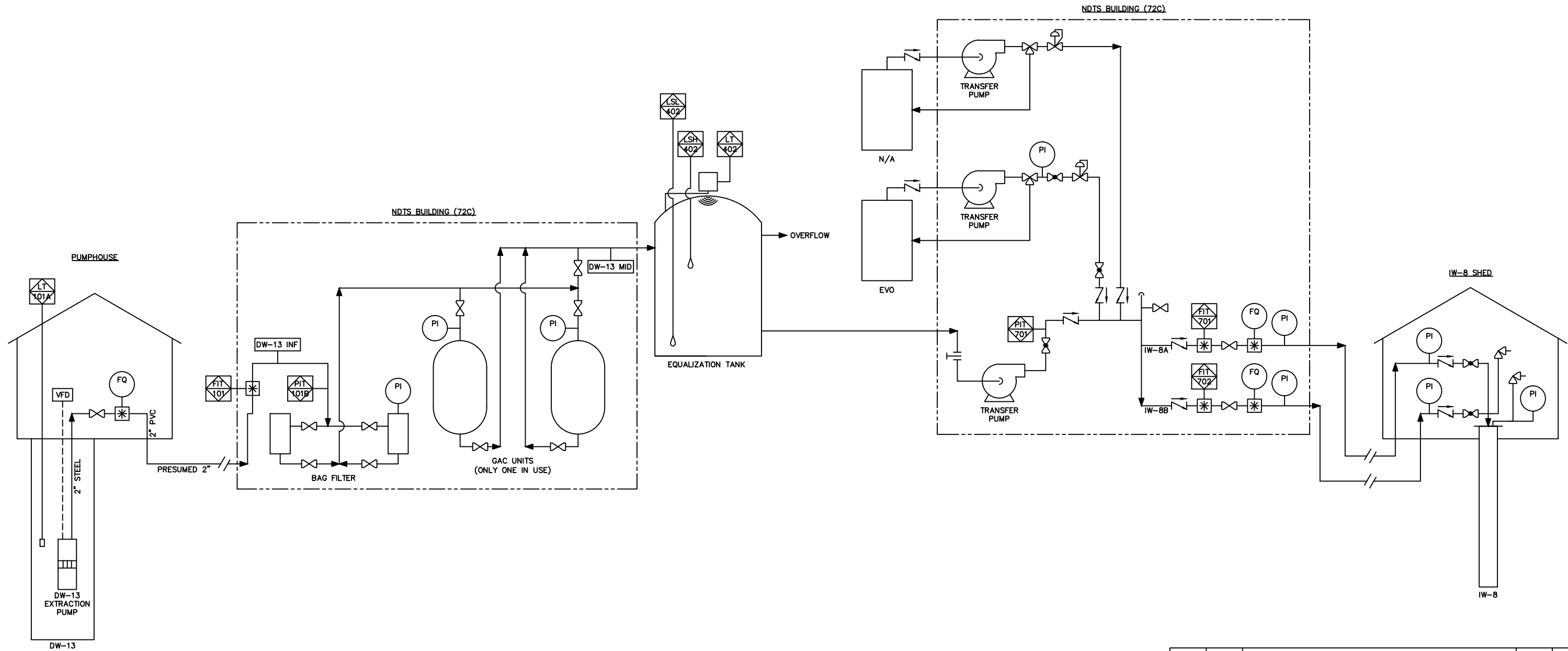


**Facility Location and Features**  
Atlantic Research Corporation, Gainesville, Virginia

TRC Environmental Inc.  
11231 Cornell Park Drive  
Cincinnati, Ohio 45242

Project: 192457.0002      3/6/2014

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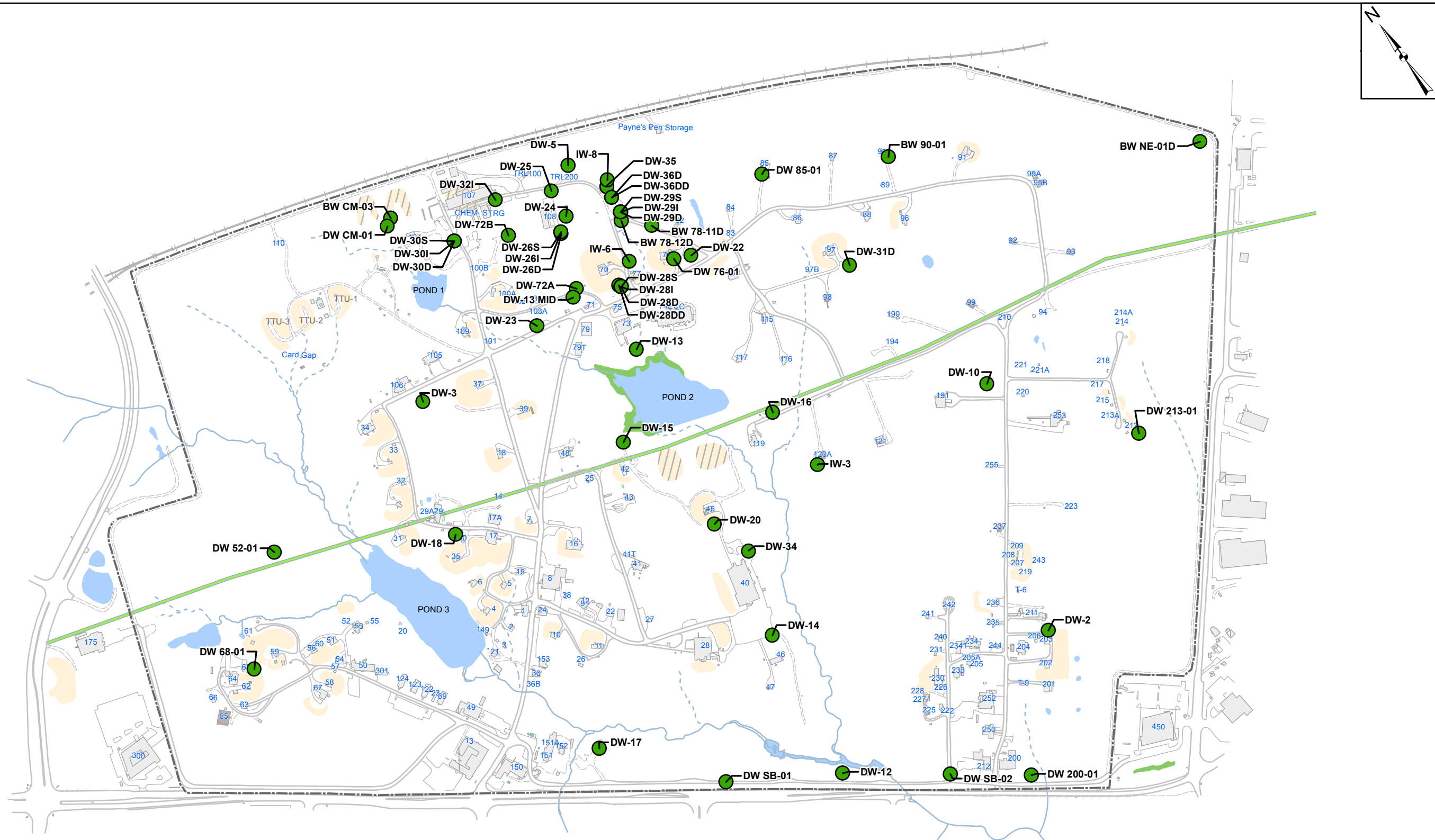
ACRONYMS:

GAC	GRANULAR ACTIVATED CARBON
FIT	FLOW INDICATING TRANSMITTER
FQ	FLOW TOTALIZER
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LT	LEVEL TRANSMITTER
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
VFD	VARIABLE FREQUENCY DRIVE (PUMP CONTROL)

LEGEND:

	BALL VALVE
	GATE VALVE
	CHECK VALVE
	KNIFE GATE VALVE
	PRESSURE REGULATING VALVE
	THREE-WAY VALVE
	FLOW METER

	1/28/14	Drawing CAD files provided by GSA. Updated by TRC since 1/28/2014		
REV	DATE	DESCRIPTION		DRN APP
<div><div>11231 CORNELL PARK DRIVE CINCINNATI, OHIO 45242 PHONE: 513-489-2255</div></div>				
TITLE: NDTS PIPING AND INSTRUMENTATION DIAGRAM				
PROJECT: ARC GAINESVILLE				
SITE: ATLANTIC RESEARCH CORPORATION GAINESVILLE, VIRGINIA				
<div>THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.</div> <div>SIGNATURE</div> <div>DATE</div>		DESIGN BY:	TRC	DATE: APRIL 23, 2010
		DRAWN BY:	TRC	PROJECT NO.: 192457.0001
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		REVIEWED BY:		DRAWING NO.:
		APPROVED BY:		2



Legend

● Deep Groundwater Sampling Locations

Site Features

--- Site Boundary	■ Building	■ Wetland
— Paved Road	■ Former Building	■ Pond
--- Unpaved Road	— High Pressure Gas line	
— Pavement	■ Berm	
— Parking	■ Historic Burn Area /TTU	
— Railroad Track	— Perennial Surface Water	
— Tank	--- Ephemeral Surface Water	

Notes:

- 1) IW-8 is the NDTs Injection well and is not sampled. DW-13 MID is the surrogate for IW-8.
- 2) DW-13 MID is the NDTs post-carbon treatment sample point located in Building 72C.
- 3) DW-13 is sampled inside Building 72C prior to treatment.
- 4) Blue numbers indicate building numbers



Deep Groundwater Sampling 2012-2013  
Atlantic Research Corporation, Gainesville, Virginia



TRC Environmental Inc.  
11231 Cornell Park Drive  
Cincinnati, Ohio 45242

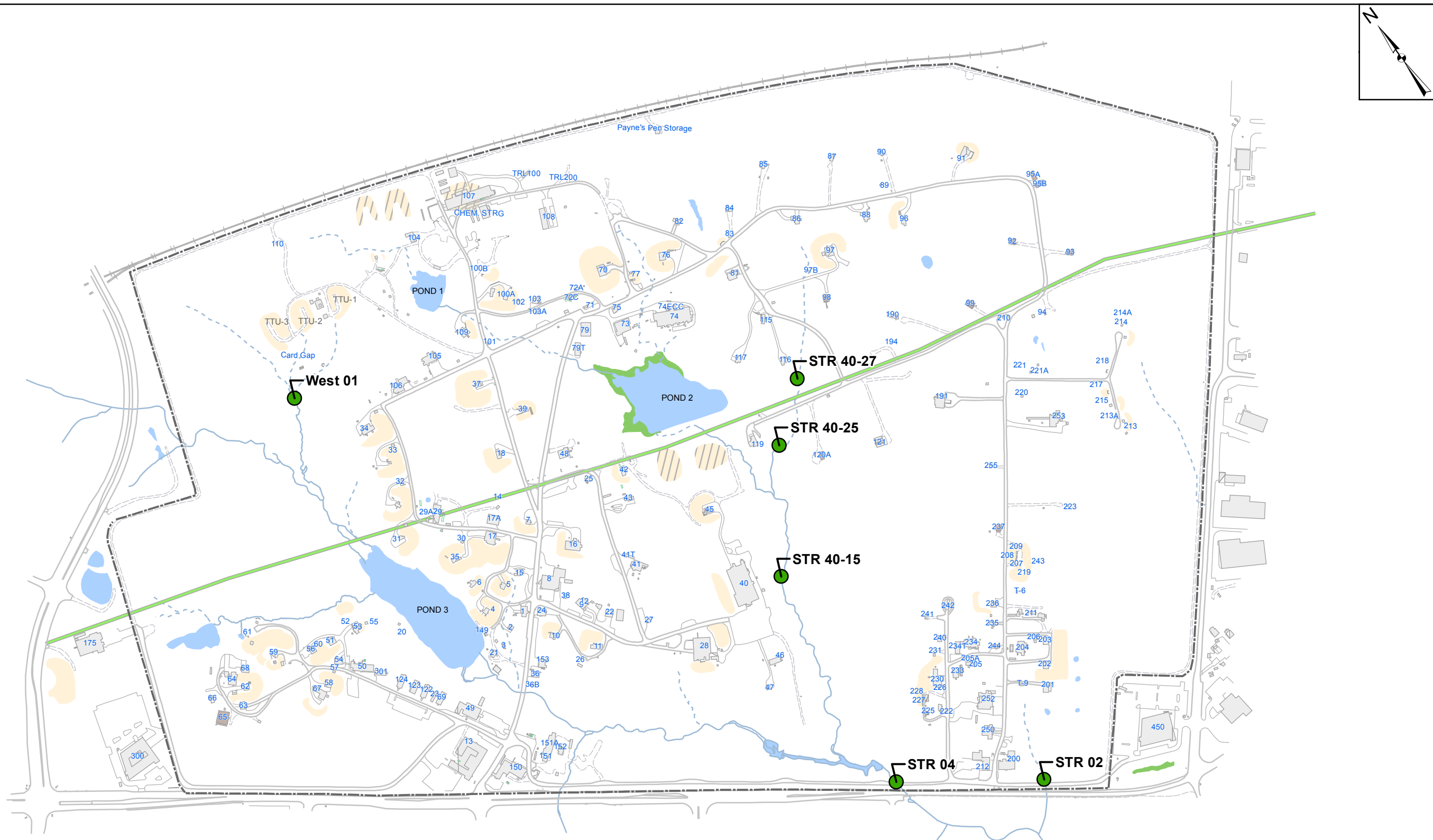
Project: 192457.0002

3/6/2014

Figure  
3



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#### Legend

- Surface Water Sample Locations

#### Site Features

- Site Boundary
- Paved Road
- Unpaved Road
- Pavement
- Parking
- Railroad Track
- Tank
- Building
- Former Building
- High Pressure Gas line
- Berm
- Historic Burn Area /TTU
- Perennial Surface Water
- Ephemeral Surface Water
- Wetland
- Pond

#### Notes:

- 1) Blue numbers indicate building numbers



#### Surface Water Sampling Locations 2012-2013

Atlantic Research Corporation, Gainesville, Virginia



TRC Environmental Inc.  
11231 Cornell Park Drive  
Cincinnati, Ohio 45242

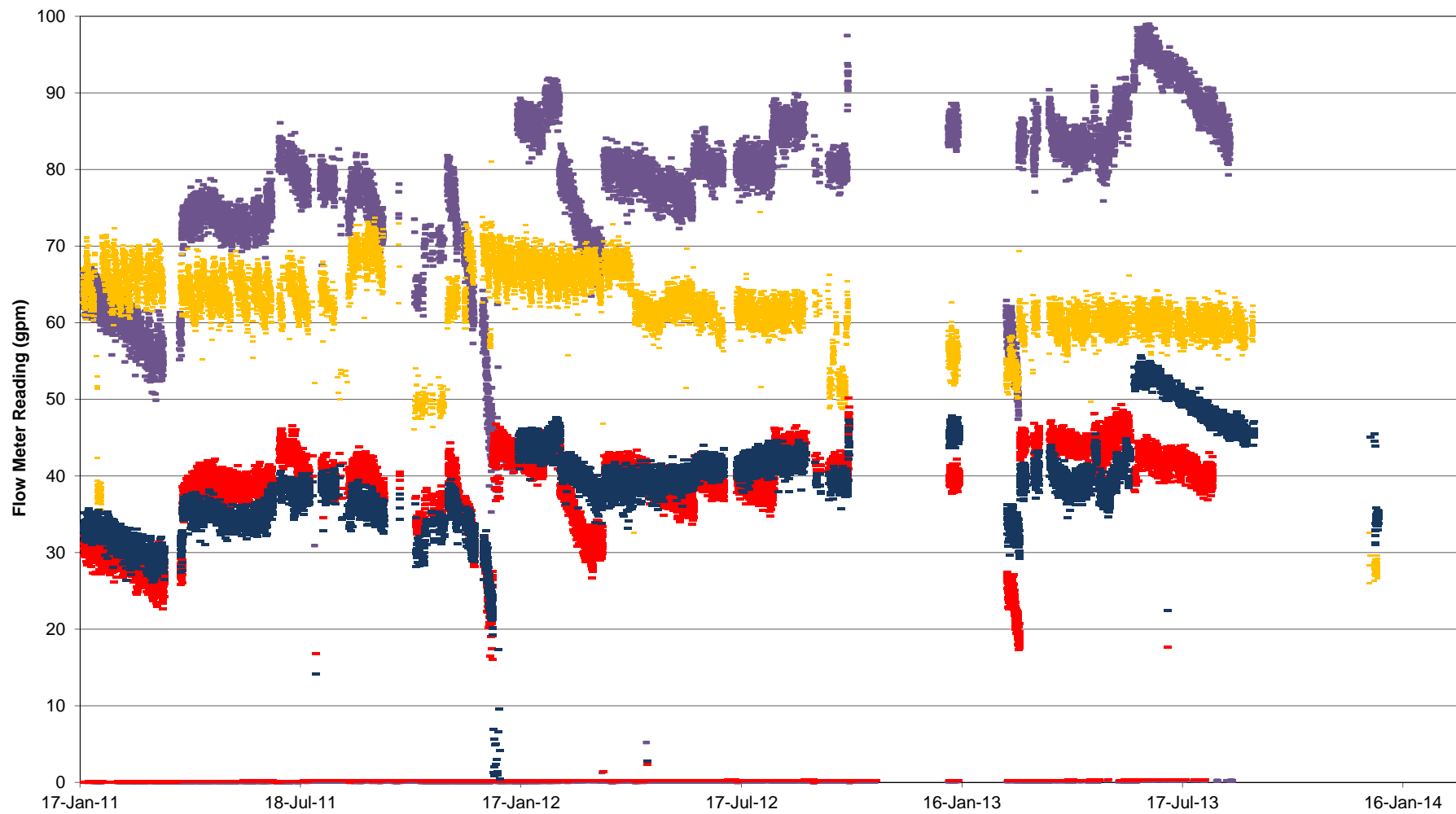
Project: 192457.0002

3/6/2014

Figure

5

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- Combined Injection into IW-8

- DW-13 - Extraction (FT-101)

- IW-8A - Injection (FT-701)

- IW-8B - Injection (FT-702)

**Note:**  
gpm - gallons per minute  
NDTS - Northern Deep Treatment System

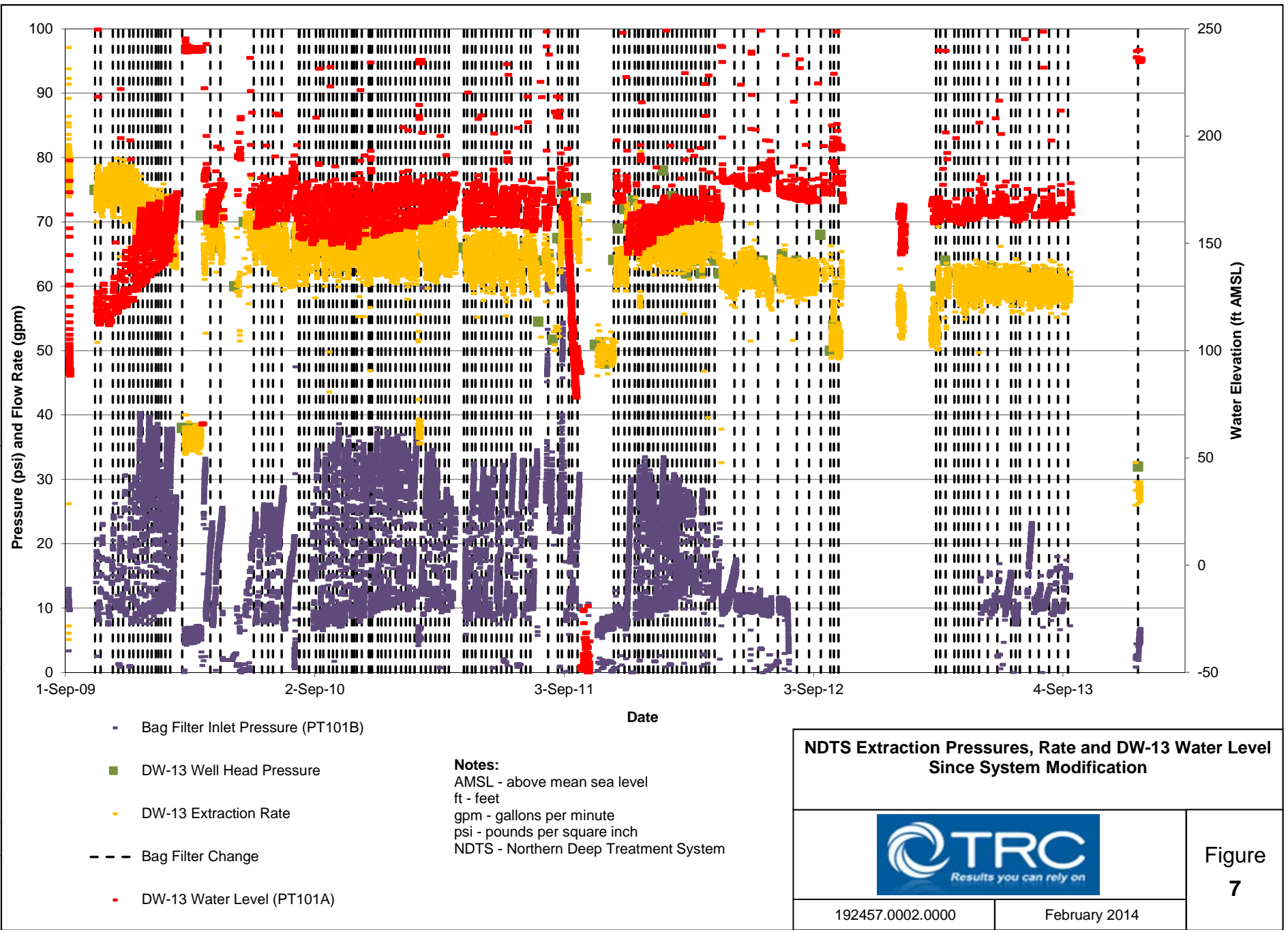
**NDTS Injection and Extraction Rates  
Since System Modification**  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

February 2014

**Figure  
6**



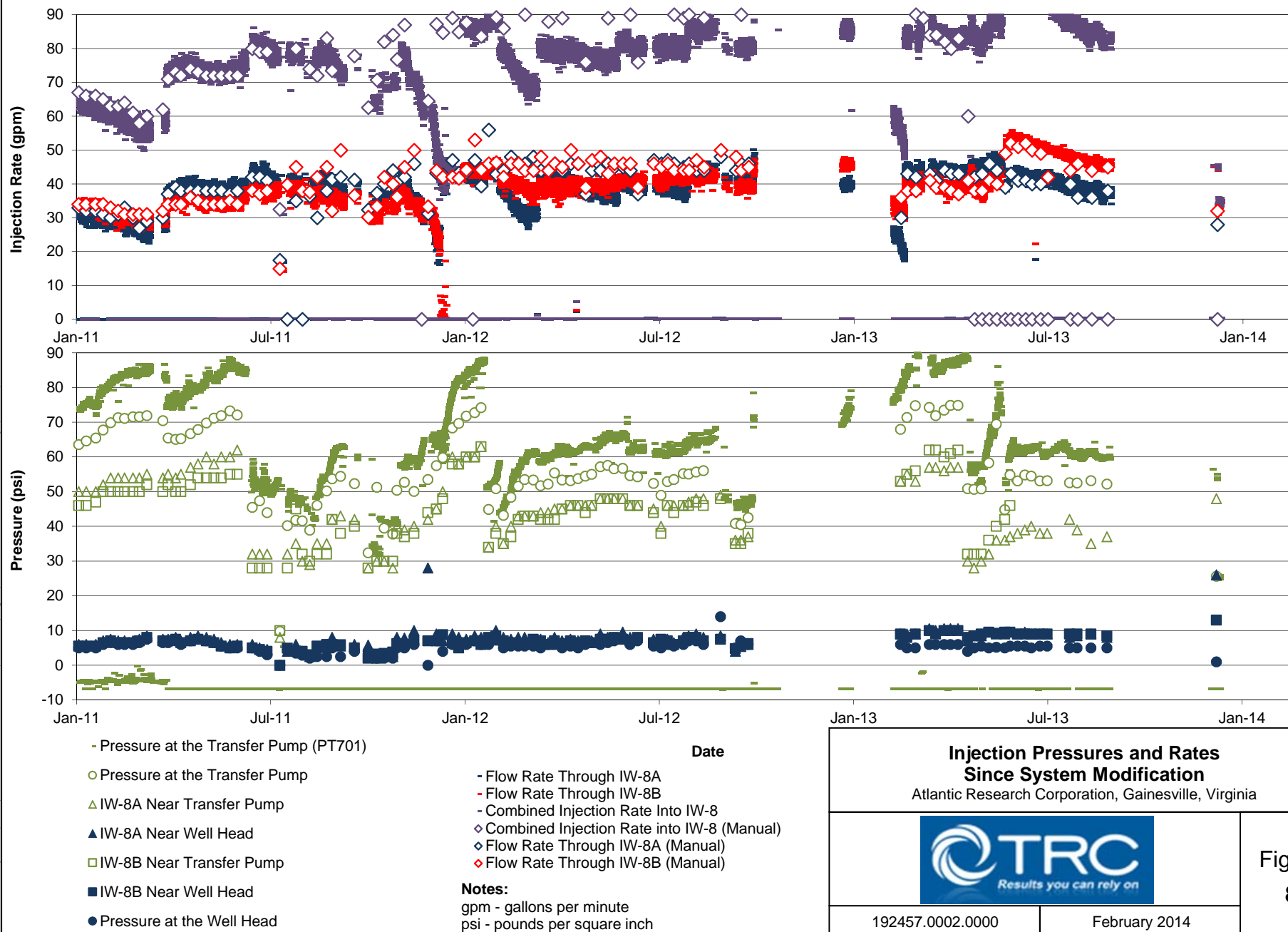
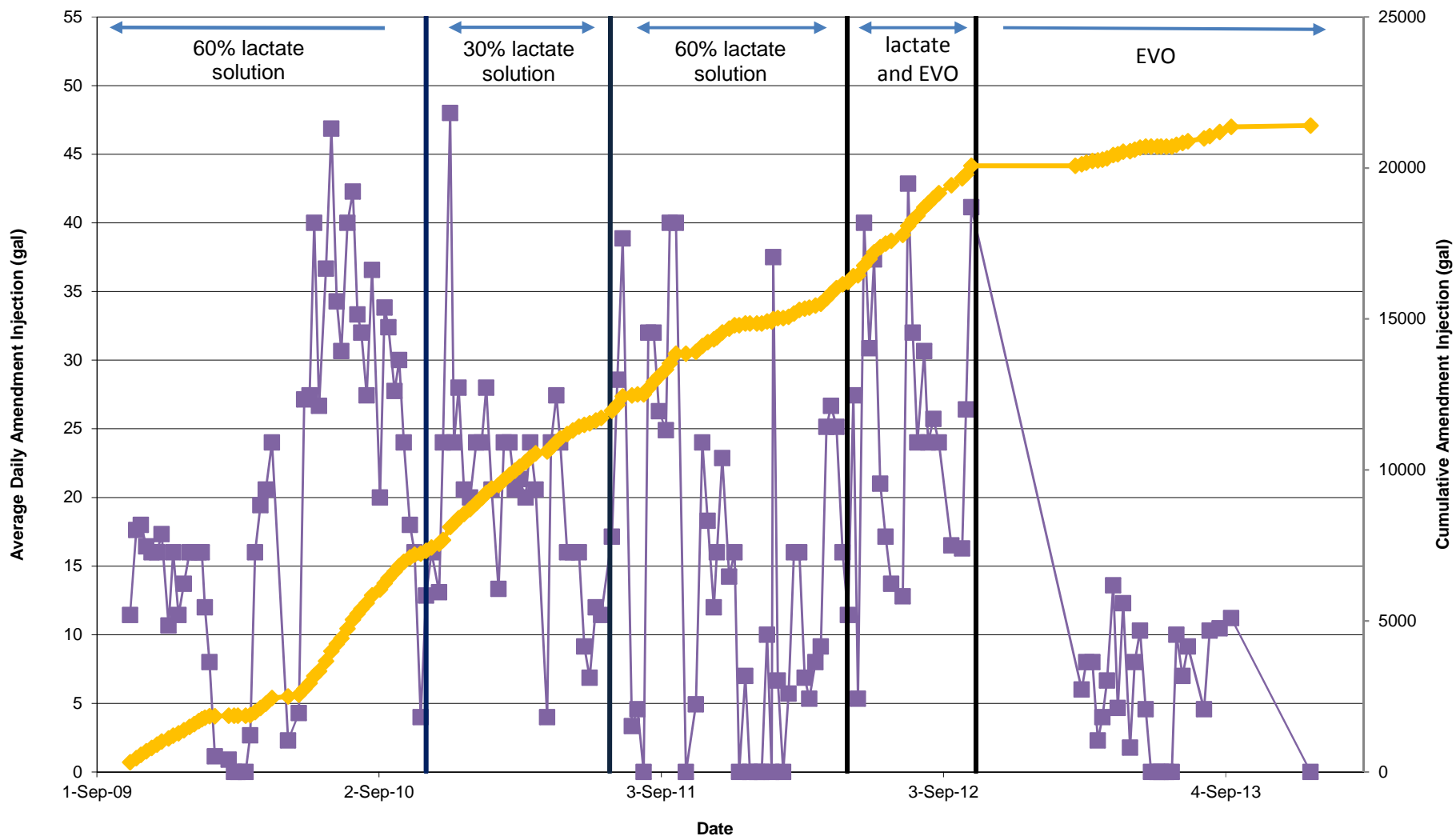


Figure  
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—■— Amendment - Daily

—◆— Amendment - Cumulative

**Note:**  
gal - gallons

Lactate volumes represent equivalent  
60% solution volumes.

### Average Daily and Cumulative Amendment Injection Since System Modification

Atlantic Research Corporation Facility, Gainesville, Virginia

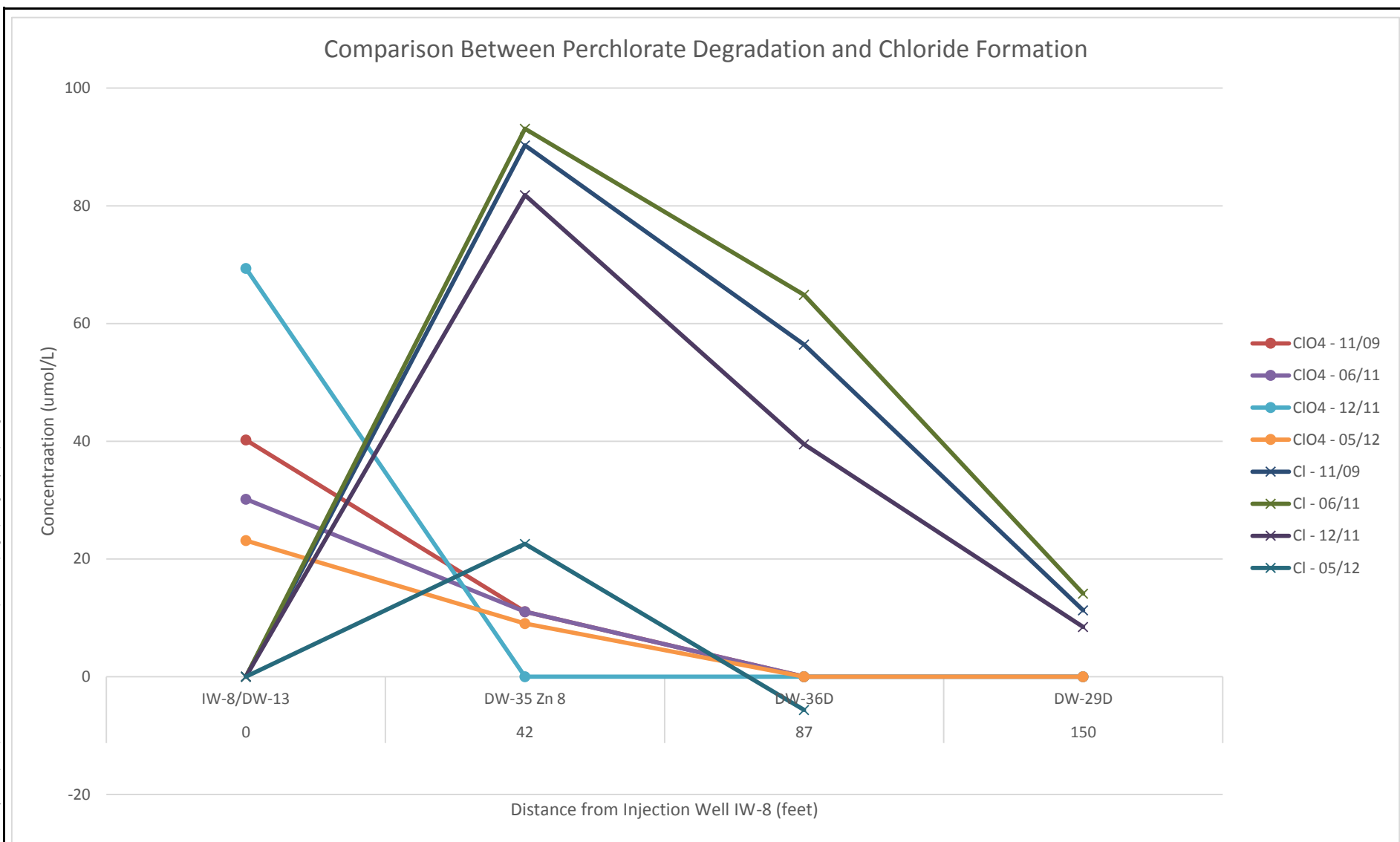


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February 2014

Figure  
9

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**Changes in Concentrations of Parent and Daughter Compounds with Distance from IW-8**  
**Perchlorate Degradation**  
Atlantic Research Corporation, Gainesville, Virginia

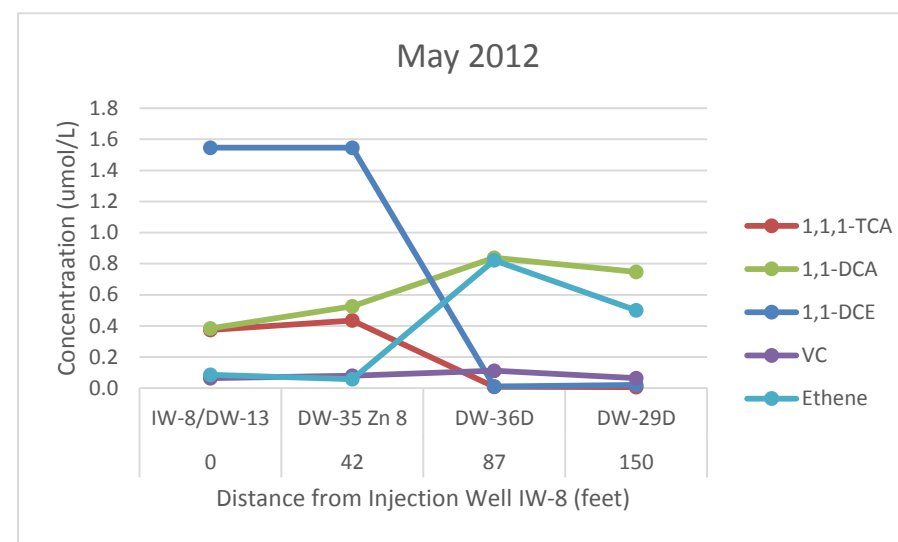
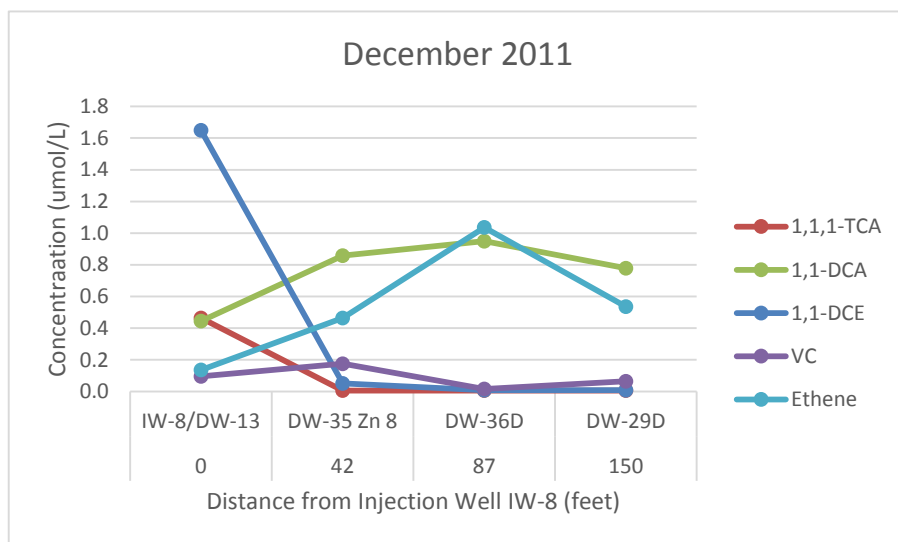
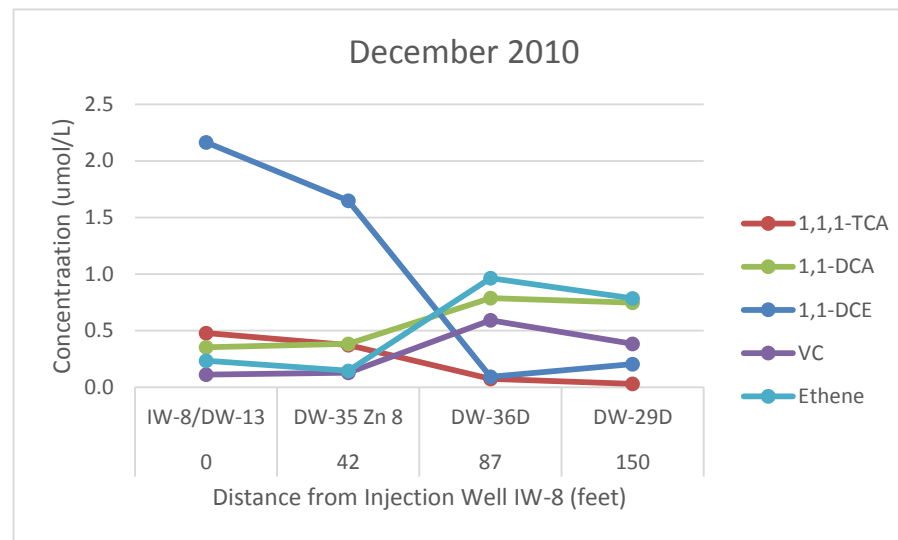
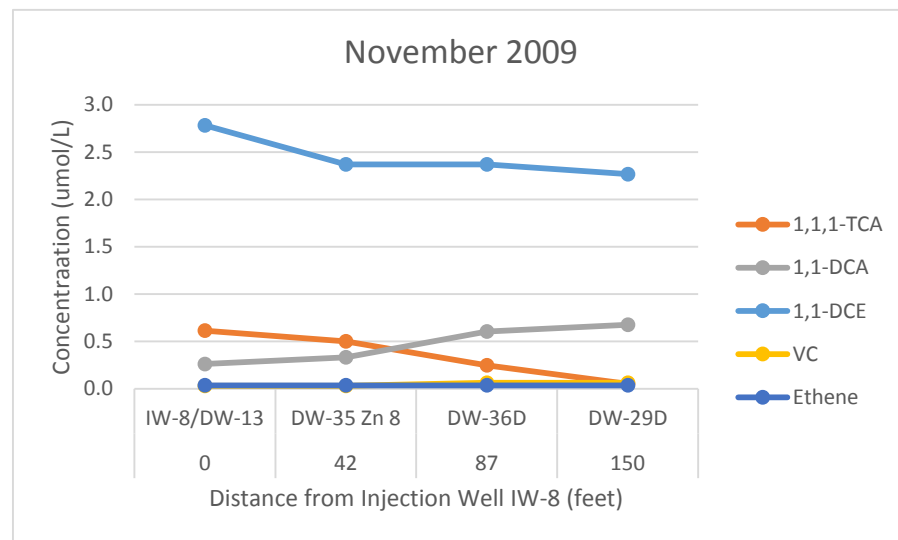


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February 2014

Figure  
10A

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**Changes in Concentrations of Parent and Daughter Compounds with Distance from IW-8**  
**1,1,1-TCA**  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

February 2014

Figure  
10B

## **TABLES**



**TABLE 1**  
**Analytical Data for Boundary Compliance Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	Deep DW 200-01 5/3/2012 GWW	Deep DW 200-01 5/29/2013 GWW	Deep DW 200-01 11/18/2013 GWW	Deep DW SB-01 5/7/2012 GWW	Deep DW SB-01 5/7/2012 GWWDUP	Deep DW SB-01 5/28/2013 GWW	Deep DW SB-01 11/18/2013 GWW	Deep DW SB-02 5/1/2012 GWW
Manganese, dissolved	0.38	mg/l				<b>1.21</b>	<b>1.21</b>			
Perchlorate in Water LC/MS/MS	15	ug/l	0.79 J	1 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,3-Dinitrobenzene	1.6	ug/l						0.2 U		
RDX	6.1	ug/l						0.35 U		
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4 J
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	<b>11</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l			70 U				70 U	
1,4-Dioxane (8270)	6.7	ug/l		0.051 U				0.14 j		
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.9 J
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 J
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1016	0.5 Total	ug/l								
PCB-1221		ug/l								
PCB-1232		ug/l								
PCB-1242		ug/l								
PCB-1248		ug/l								
PCB-1254		ug/l								
PCB-1260		ug/l								

Notes:

Bold font indicates value above screening level

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 1**  
**Analytical Data for Boundary Compliance Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	Deep DW SB-02 11/7/2012 GWW	Deep DW SB-02 5/28/2013 GWW	Deep DW SB-02 11/18/2013 GWW	Deep DW-12 5/1/2012 GWW	Deep DW-12 11/7/2012 GWW	Deep DW-12 5/21/2013 GWW	Deep DW-12 11/18/2013 GWW	Deep DW-17 5/28/2013 GWW
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water LC/MS/MS	15	ug/l		1 U	0.2 U	0.2 U		1 U	0.2 U	1 U
1,3-Dinitrobenzene	1.6	ug/l		0.2 U			0.2 U	0.2 U		
RDX	6.1	ug/l		0.4 U			0.2 U	0.2 U		
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	4 J	4 J	3 J	2 J	2 J	2 Jj	2 J	1 U
1,1-Dichloroethene	7	ug/l	<b>11</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>7 j</b>	<b>7</b>	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l			70 U				70 U	
1,4-Dioxane (8270)	6.7	ug/l		0.37				0.18 j		0.057 J
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1016	0.5 Total	ug/l								
PCB-1221		ug/l								
PCB-1232		ug/l								
PCB-1242		ug/l								
PCB-1248		ug/l								
PCB-1254		ug/l								
PCB-1260		ug/l								

Notes:

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Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details

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The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 1**  
**Analytical Data for Boundary Compliance Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	Shallow SW 200-02 5/2/2012 GWW	Shallow SW 200-02 5/22/2013 GWW	Shallow SW 200-02 5/22/2013 GWWDUP	Shallow SW 200-02 11/19/2013 GWW	Shallow SW 200-02 11/19/2013 GWWDUP	Shallow SW 212-01 5/3/2012 GWW	Shallow SW 212-01 5/23/2013 GWW	Shallow SW 222-02 5/7/2012 GWW
Manganese, dissolved	0.38	mg/l								0.0239
Perchlorate in Water LC/MS/MS	15	ug/l	0.25 J	1 U	1 U	0.2 U	0.2 U	0.24 J	1	8.6
1,3-Dinitrobenzene	1.6	ug/l		0.2 U	0.2 U				0.2 U	
RDX	6.1	ug/l		0.2 U	0.2 U				0.2 U	
1,1,1-Trichloroethane	200	ug/l	3 J	3 Jj	2 J	2 J	2 J	0.8 U	0.8 U	3 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	2 J	2 Jj	2 J	2 J	2 J	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	3 J	3 Jj	2 J	3 J	3 J	0.8 U	0.8 U	4 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l				70 U	70 U			
1,4-Dioxane (8270)	6.7	ug/l		0.73 j	0.75					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 J
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1016	0.5 Total	ug/l		0.083 U	0.083 U				0.087 U	
PCB-1221		ug/l		0.083 U	0.083 U				0.087 U	
PCB-1232		ug/l		0.17 U	0.17 U				0.17 U	
PCB-1242		ug/l		0.083 U	0.083 U				0.087 U	
PCB-1248		ug/l		0.083 U	0.083 U				0.087 U	
PCB-1254		ug/l		0.083 U	0.083 U				0.087 U	
PCB-1260		ug/l		0.12 U	0.13 U				0.13 U	

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 1**  
**Analytical Data for Boundary Compliance Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	Shallow SW 222-02 5/22/2013 GWW	Shallow SW 222-02 11/19/2013 GWW	Shallow SW PBS-01 5/2/2012 GWW	Shallow SW PBS-01 5/21/2013 GWW	Shallow SW PBS-01 11/19/2013 GWW	Shallow SW SB-01 5/7/2012 GWW	Shallow SW SB-01 5/21/2013 GWW	Shallow SW SB-01 11/19/2013 GWW
Manganese, dissolved	0.38	mg/l						<b>1.76</b>		
Perchlorate in Water LC/MS/MS	15	ug/l	4.6 j	5	0.2 U	1 U	0.2 U	0.2 U	1 U	0.2 U
1,3-Dinitrobenzene	1.6	ug/l	0.2 U			0.2 U			0.2 U	
RDX	6.1	ug/l	0.25 U			0.3 U			0.2 U	
1,1,1-Trichloroethane	200	ug/l	1 Jj	1 J	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	2 Jj	3 J	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l		70 U			70 U			70 U
1,4-Dioxane (8270)	6.7	ug/l	2.6 j							
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 J	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1016	0.5 Total	ug/l	0.089 U			0.1 U			0.098 U	
PCB-1221		ug/l	0.089 U			0.1 U			0.098 U	
PCB-1232		ug/l	0.18 U			0.21 U			0.2 U	
PCB-1242		ug/l	0.089 U			0.1 U			0.098 U	
PCB-1248		ug/l	0.089 U			0.1 U			0.098 U	
PCB-1254		ug/l	0.089 U			0.1 U			0.098 U	
PCB-1260		ug/l	0.13 U			0.15 U			0.15 U	

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**TABLE 1**  
**Analytical Data for Boundary Compliance Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	Shallow SW SB-02 5/2/2012 GWW	Shallow SW SB-02 5/21/2013 GWW	Shallow SW SB-02 11/20/2013 GWW	Shallow SW SB-03 5/3/2012 GWW	Shallow SW SB-03 5/22/2013 GWW	Shallow SW SB-03 11/20/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate in Water LC/MS/MS	15	ug/l	0.73 J	1 U	0.45 J	0.27 J	1 U	0.53 J
1,3-Dinitrobenzene	1.6	ug/l		0.2 U			0.2 U	
RDX	6.1	ug/l		0.2 U			0.2 U	
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U	1 J
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U	0.8 U	1 J	0.8 U	2 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l			70 U			70 U
1,4-Dioxane (8270)	6.7	ug/l		0.053 U				
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 J	0.8 U	1 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1016	0.5 Total	ug/l		0.086 U			0.1 U	
PCB-1221		ug/l		0.086 U			0.1 U	
PCB-1232		ug/l		0.17 U			0.2 U	
PCB-1242		ug/l		0.086 U			0.1 U	
PCB-1248		ug/l		0.086 U			0.1 U	
PCB-1254		ug/l		0.086 U			0.1 U	
PCB-1260		ug/l		0.13 U			0.15 U	

Notes:

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The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 78-11D 5/15/2012 GWW	BW 78-11D 5/30/2013 GWW	BW 78-12D 5/14/2012 GWW	BW 78-12D 5/22/2013 GWW	BW 90-01 5/8/2012 GWW	BW 90-01 5/23/2013 GWW	BW CM-03 4/2/2012 GWW
Manganese, dissolved	0.38	mg/l		0.0048 J		0.0013 J	0.236	0.184	
Perchlorate	15	ug/l		<b>35</b>	<b>5700</b>	<b>28000</b>		1 U	<b>26</b>
1,3-Dinitrobenzene	1.6	ug/l				0.2 U			
RDX	6.1	ug/l				0.2 U			
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U					
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U					
1,1-Dichloroethane	120	ug/l	1 U	1 U					
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U					
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U					
1,2-Dichloroethane	5	ug/l	1 U	1 U					
1,4-Dioxane (8260)	6.7	ug/l							
1,4-Dioxane (8270)	6.7	ug/l							
Benzene	5	ug/l	0.5 U	0.5 U					
Carbon Tetrachloride	5	ug/l	1 U	1 U					
Chloroethane		ug/l	1 U	1 U					
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U					
Methylene Chloride	5	ug/l	2 U	2 U					
Tetrachloroethene	5	ug/l	0.8 U	0.8 U					
Trichloroethene	5	ug/l	1 U	1 U					
Vinyl Chloride	2	ug/l	1 U	1 U					

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW CM-03 5/30/2013 GWW	BW NE-01D 5/29/2013 GWW	DW 213-01 5/7/2012 GWW	DW 213-01 5/21/2013 GWW	DW 52-01 5/22/2013 GWW	DW 68-01 5/22/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	<b>32</b>	1 U	<b>43</b>	<b>43</b>	1.5 j	1 U
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U		0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U		0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U		1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U		0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U		1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U		1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l						
Benzene	5	ug/l	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U		1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U		1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U		0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U		2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U		0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U		1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U		1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW 76-01 5/1/2012 GWW	DW 76-01 5/29/2013 GWW	DW 85-01 5/28/2013 GWW	DW CM-01 4/3/2012 GWW	DW CM-01 5/29/2013 GWW	DW-10 5/21/2013 GWW
Manganese, dissolved	0.38	mg/l		0.001 J				
Perchlorate	15	ug/l		<b>1200</b>	7.9	<b>52</b>	<b>42</b>	7.3
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l	69	81	0.8 U			0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U			0.8 U
1,1-Dichloroethane	120	ug/l	17	16	1 U			1 U
1,1-Dichloroethene	7	ug/l	<b>1000</b>	<b>900</b>	0.8 U			0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U			1 U
1,2-Dichloroethane	5	ug/l	1 J	1 J	1 U			1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l		31 j				
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U			0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U			1 U
Chloroethane		ug/l	1 U	1 U	1 U			1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U			0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U			2 U
Tetrachloroethene	5	ug/l	2 J	2 J	0.8 U			0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U			1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U			1 U

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-14 5/28/2013 GWW	DW-15 5/3/2012 GWW	DW-15 11/7/2012 GWW	DW-15 5/21/2013 GWW	DW-15 5/31/2013 GWW	DW-15 11/20/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	1 U			1 U		
1,3-Dinitrobenzene	1.6	ug/l				0.2 U		
RDX	6.1	ug/l				0.35 U		
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l	1 U	6	4 J	6		1 J
1,1-Dichloroethene	7	ug/l	1 J	<b>12</b>	4 J	<b>8</b>		2 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U		1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l						70 U
1,4-Dioxane (8270)	6.7	ug/l					2 j	
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U		1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U		1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	1 J	3 J	1 J		2 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U		2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
Trichloroethene	5	ug/l	1 U	4 J	2 J	3 J		2 J
Vinyl Chloride	2	ug/l	1 U	<b>7</b>	<b>6</b>	<b>6</b>		<b>3 J</b>

Notes:

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The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-16 5/2/2012 GWW	DW-16 11/7/2012 GWW	DW-16 5/22/2013 GWW	DW-16 11/20/2013 GWW	DW-18 5/3/2012 GWW	DW-18 5/22/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l			7.6 j	3	0.2 U	1 U
1,3-Dinitrobenzene	1.6	ug/l			0.2 U			
RDX	6.1	ug/l			0.42 Jj			
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	15	14	19 j	17	11	10 j
1,1-Dichloroethene	7	ug/l	<b>18</b>	<b>20</b>	<b>15 j</b>	<b>18</b>	<b>19</b>	<b>17 j</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l				70 U		
1,4-Dioxane (8270)	6.7	ug/l			1.5 j			1.4 j
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	16	19 j
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	29	28 j
Vinyl Chloride	2	ug/l	2 J	1 J	1 Jj	1 J	1 U	1 U

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The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-2 5/22/2013 GWW	DW-20 5/4/2012 GWW	DW-20 5/4/2012 GWWDUP	DW-20 5/22/2013 GWW	DW-23 5/2/2012 GWW	DW-23 5/23/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	1 U			1 U	<b>22</b>	<b>18</b>
1,3-Dinitrobenzene	1.6	ug/l						0.2 U
RDX	6.1	ug/l						0.26 J
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	54	65
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	4 J	4 J	4 Jj	16	15
1,1-Dichloroethene	7	ug/l	0.8 U	<b>13</b>	<b>13</b>	<b>13 j</b>	<b>49</b>	<b>43</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l				0.7 j		<b>12</b>
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	4 J	3 J	2 Jj	<b>7</b>	4 J
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U

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**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-24 5/11/2012 GWW	DW-24 5/22/2013 GWW	DW-24 5/22/2013 GWWDUP	DW-25 5/2/2012 GWW	DW-25 5/23/2013 GWW	DW-25 5/23/2013 GWWDUP
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	<b>62</b>	<b>41</b>	<b>40</b>		1 U	1 U
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l	2 J	0.9 J	1 J	3 J	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	54	54	54	85	75	75
1,1-Dichloroethene	7	ug/l	<b>18</b>	<b>11</b>	<b>11</b>	6	2 J	1 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l		4	4.3			
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 J	1 U	1 J	2 J	3 J
cis-1,2-Dichloroethene	70	ug/l	1 J	6	6	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>160</b>	<b>120</b>	<b>110</b>	0.9 J	0.8 U	0.8 U
Trichloroethene	5	ug/l	2 J	3 J	3 J	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	<b>5</b>	<b>3 J</b>	<b>3 J</b>	<b>6</b>	<b>4 J</b>	<b>4 J</b>

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**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-26D 5/11/2012 GWW	DW-26D 5/23/2013 GWW	DW-26I 5/11/2012 GWW	DW-26I 5/23/2013 GWW	DW-26S 5/23/2013 GWW	DW-28D 5/11/2012 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l		1 U	<b>120</b>	<b>90</b>	1 U	
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	2 J	1 J		5 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l	43	59	17	21		41
1,1-Dichloroethene	7	ug/l	<b>17</b>	<b>10</b>	<b>42</b>	<b>25</b>		<b>45</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U		1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l				2.7		
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U		1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U		1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 J	1 J	0.8 J		0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U		2 U
Tetrachloroethene	5	ug/l	<b>13</b>	<b>9</b>	<b>420</b>	<b>360</b>		<b>6</b>
Trichloroethene	5	ug/l	1 U	3 J	1 U	1 U		1 U
Vinyl Chloride	2	ug/l	<b>7</b>	<b>6</b>	<b>3 J</b>	2 J		<b>7</b>

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**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-28D 5/23/2013 GWW	DW-28D 5/23/2013 GWWDUP	DW-28I 5/11/2012 GWW	DW-28I 5/23/2013 GWW	DW-28S 5/23/2013 GWW	DW-29S 5/10/2012 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	<b>150</b>	<b>150</b>	<b>11000</b>	<b>9800</b>	<b>530</b>	<b>75000</b>
1,3-Dinitrobenzene	1.6	ug/l	0.2 U	0.2 U				
RDX	6.1	ug/l	0.26 U	0.25 J				
1,1,1-Trichloroethane	200	ug/l	3 J	3 J	30	24	4 J	
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	
1,1-Dichloroethane	120	ug/l	59	55	40	53	25	
1,1-Dichloroethene	7	ug/l	<b>32</b>	<b>31</b>	<b>96</b>	<b>72</b>	<b>14</b>	
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l	3.5	3.7		5.3	<b>17</b>	
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	
Chloroethane		ug/l	2 J	2 J	1 U	1 U	1 U	
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	
Tetrachloroethene	5	ug/l	<b>5</b>	<b>5</b>	<b>16</b>	<b>18</b>	0.8 U	
Trichloroethene	5	ug/l	1 U	1 U	3 J	3 J	1 U	
Vinyl Chloride	2	ug/l	<b>6</b>	<b>5</b>	<b>5</b>	<b>4 J</b>	1 U	

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**TABLE 2**  
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**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-29S 5/22/2013 GWW	DW-3 5/4/2012 GWW	DW-3 5/23/2013 GWW	DW-30D 5/24/2013 GWW	DW-30I 5/1/2012 GWW	DW-30I 5/29/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	<b>170000</b>		1 U	<b>18</b>		2.6
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l		0.8 U	0.8 U	1 J	1 J	1 J
1,1,2-Trichloroethane	5	ug/l		0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l		13	14	13	34	36
1,1-Dichloroethene	7	ug/l		<b>9</b>	<b>7</b>	<b>84</b>	<b>170</b>	<b>160</b>
1,2,3-Trichloropropane	0.0072	ug/l		1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l		1 U	1 U	1 U	1 J	1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l	4.7		3.2	<b>11</b>		<b>24 j</b>
Benzene	5	ug/l		2 J	2 J	0.5 U	1 J	1 J
Carbon Tetrachloride	5	ug/l		1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l		1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l		61	<b>78</b>	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l		2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l		<b>17</b>	<b>8</b>	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l		<b>26</b>	<b>17</b>	1 U	1 J	1 U
Vinyl Chloride	2	ug/l		2 J	2 J	1 U	<b>20</b>	<b>23</b>

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**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-30S 5/29/2013 GWW	DW-31D 5/1/2012 GWW	DW-31D 5/24/2013 GWW	DW-32I 5/8/2012 GWW	DW-32I 5/30/2013 GWW	DW-34 5/9/2012 GWW
Manganese, dissolved	0.38	mg/l					<b>4.27</b>	0.0398
Perchlorate	15	ug/l	<b>200</b>		1 U		1 U	
1,3-Dinitrobenzene	1.6	ug/l						
RDX	6.1	ug/l						
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	40	120	
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	5 J	<b>14</b>	
1,1-Dichloroethane	120	ug/l	1 U	3 J	2 J	<b>130</b>	<b>300</b>	
1,1-Dichloroethene	7	ug/l	6	<b>8</b>	5 J	<b>1500</b>	<b>3200</b>	
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	<b>6</b>	<b>19</b>	
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l	0.14		0.39		<b>300</b>	
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	<b>6</b>	<b>17</b>	
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	
Chloroethane		ug/l	1 U	1 U	1 U	3 J	6	
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	2 J	
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 J	
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	2 J	<b>6</b>	
Trichloroethene	5	ug/l	1 U	1 U	1 U	4 J	<b>14</b>	
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	<b>96</b>	<b>110</b>	

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 2**  
**Analytical Data for Plume Area Deep Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-5 5/23/2013 GWW	DW-72A 5/3/2012 GWW	DW-72A 5/24/2013 GWW	IW-3 5/23/2013 GWW	IW-6 5/11/2012 GWW	IW-6 5/30/2013 GWW
Manganese, dissolved	0.38	mg/l						
Perchlorate	15	ug/l	1 U	<b>52</b>	<b>21</b>	1 U	<b>180000</b>	<b>110000</b>
1,3-Dinitrobenzene	1.6	ug/l			0.2 U			0.4 U
RDX	6.1	ug/l			0.23 U			0.4 U
1,1,1-Trichloroethane	200	ug/l	0.8 U	3 J	3 J	0.8 U	4 J	4 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	6	7	10	25	17	31
1,1-Dichloroethene	7	ug/l	1 J	<b>79</b>	<b>66</b>	<b>10</b>	<b>22</b>	<b>21</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l						
1,4-Dioxane (8270)	6.7	ug/l						5.1
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	<b>44</b>	<b>45</b>	0.8 U	<b>7</b>	<b>8</b>
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	2 J	2 J	<b>11</b>	2 J	<b>3 J</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 100-02S 5/4/2012 GWW	BW 100-02S 5/24/2013 GWW	BW 116-01 5/23/2013 GWW	BW 119-01 5/4/2012 GWW	BW 119-01 5/23/2013 GWW	BW 14-02S 5/2/2012 GWW	BW 14-02S 5/2/2012 GWWDUP	BW 14-02S 5/30/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	0.31 J	1 U	<b>16</b>	<b>260</b>	<b>140</b>	<b>2700</b>	<b>2700</b>	<b>2500</b>
1,3-Dinitrobenzene	1.6	ug/l			0.2 U		0.2 U			
RDX	6.1	ug/l			5.7		3.4			
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U				34	39	40
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U				0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U				3 J	3 J	3 J
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U				<b>14</b>	<b>13</b>	<b>16</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U				1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U				1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U				0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U				1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U				1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U				28	32	24
Methylene Chloride	5	ug/l	2 U	2 U				2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U				<b>290</b>	<b>300</b>	<b>250</b>
Trichloroethene	5	ug/l	1 U	1 U				<b>33</b>	<b>33</b>	<b>27</b>
Vinyl Chloride	2	ug/l	1 U	1 U				1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 16-04D 5/4/2012 GWW	BW 16-04D 11/8/2012 GWW	BW 16-04D 11/8/2012 GWWDUP	BW 16-04D 5/30/2013 GWW	BW 16-04D 11/21/2013 GWW	BW 16-04D 11/21/2013 GWWDUP	BW 200-01 5/7/2012 GWW	BW 21-04D 5/14/2012 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l							<b>0.421</b>	
Perchlorate in Water	15	ug/l	<b>4300</b>	<b>4400</b>	<b>4000</b>	<b>3100</b>	<b>4000</b>	<b>3500</b>		1500
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	24	21	22	26	19	18		
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		
1,1-Dichloroethane	120	ug/l	3 J	3 J	3 J	3 J	3 J	3 J		
1,1-Dichloroethene	7	ug/l	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>11</b>		
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		
1,4-Dioxane (8260)	6.7	ug/l					70 U	70 U		
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U		
cis-1,2-Dichloroethene	70	ug/l	18	17	17	16	13	13		
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U		
Tetrachloroethene	5	ug/l	<b>230</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>190</b>	<b>190</b>		
Trichloroethene	5	ug/l	<b>17</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>12</b>	<b>12</b>		
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 21-04D 5/30/2013 GWW	BW 212-01 5/3/2012 GWW	BW 212-01 5/22/2013 GWW	BW 225-01 5/3/2012 GWW	BW 225-01 5/3/2012 GWWDUP	BW 225-01 5/23/2013 GWW	BW 237-01D 5/11/2012 GWW	BW 237-01D 5/22/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	420			31	30	22	7.2	3.4 j
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l		0.8 U	0.8 U	4 J	4 J	2 J		0.8 U
1,1,2-Trichloroethane	5	ug/l		0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l		8	6	2 J	2 J	2 J		1 U
1,1-Dichloroethene	7	ug/l		<b>10</b>	<b>8</b>	<b>11</b>	5 J	7		0.8 U
1,2,3-Trichloropropane	0.0072	ug/l		1 U	1 U	1 U	1 U	1 U		1 U
1,2-Dichloroethane	5	ug/l		1 U	1 U	1 U	1 U	1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l		1 U	1 U	1 U	1 U	1 U		1 U
Chloroethane		ug/l		1 U	1 U	1 U	1 U	1 U		1 U
cis-1,2-Dichloroethene	70	ug/l		0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
Methylene Chloride	5	ug/l		2 U	2 U	2 U	2 U	2 U		2 U
Tetrachloroethene	5	ug/l		0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
Trichloroethene	5	ug/l		<b>7</b>	5	3 J	3 J	2 J		1 U
Vinyl Chloride	2	ug/l		1 U	1 U	1 U	1 U	1 U		1 U

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 28-02S 5/9/2012 GWW	BW 28-02S 5/28/2013 GWW	BW 28-04D 5/11/2012 GWW	BW 28-04D 5/28/2013 GWW	BW 31-01S 5/1/2012 GWW	BW 31-01S 5/30/2013 GWW	BW 34-01 5/1/2012 GWW	BW 34-01 5/30/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	2800	3600	270	530		20	2100	990
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	14	13	42	40	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	3 J	3 J	4 J	4 J	1 J	1 U	5 J	4 J
1,1-Dichloroethene	7	ug/l	<b>17</b>	<b>16</b>	<b>35</b>	<b>38</b>	0.8 U	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l		<b>34 j</b>				0.7		
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	13	15	6	3 J	31	23	0.8 U	0.8 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>190</b>	<b>200</b>	<b>130</b>	<b>64</b>	<b>120</b>	<b>140</b>	<b>12</b>	<b>8</b>
Trichloroethene	5	ug/l	<b>20</b>	<b>20</b>	<b>18</b>	5 J	<b>48</b>	<b>47</b>	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 40-04 5/9/2012 GWW	BW 40-04 5/28/2013 GWW	BW 45-03S 5/7/2012 GWW	BW 45-03S 11/9/2012 GWW	BW 45-03S 11/21/2013 GWW	BW 45-03S 5/29/2013 GWW	BW 5-05S 11/8/2012 GWW	BW 5-05S 4/2/2012 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l	0.253	0.228	0.328			<b>0.386</b>		
Perchlorate in Water	15	ug/l		1 U	7.6		4	10		18
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	140	90
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	2 J	2 J	2 J	2 J	69	36
1,1-Dichloroethene	7	ug/l	2 J	3 J	1 J	1 J	1 J	1 J	<b>100</b>	<b>39</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l					70 U			
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	<b>78</b>	<b>230</b>	<b>120</b>	<b>180</b>	<b>180</b>	<b>160</b>	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>31</b>	0.8 U	<b>230</b>	<b>220</b>	<b>260</b>	<b>270</b>	2 J	0.9 J
Trichloroethene	5	ug/l	<b>6</b>	1 U	<b>33</b>	<b>36</b>	<b>42</b>	<b>46</b>	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	<b>4 J</b>	2 J	<b>4 J</b>	<b>4 J</b>	1 U	1 U

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**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 5-05S 5/29/2013 GWW	BW 5-05S 11/20/2013 GWW	BW 5-06D 4/2/2012 GWW	BW 5-06D 11/8/2012 GWW	BW 5-06D 5/29/2013 GWW	BW 5-06D 11/20/2013 GWW	BW 73-01S 5/14/2012 GWW	BW 73-01S 5/30/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	310	25	300		470	410	5.4	1.5 j
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	2 J	140	1 J	5	4 J	4 J		0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l	1 U	88	1 U	1 U	1 U	1 U		1 U
1,1-Dichloroethene	7	ug/l	1 J	<b>49</b>	2 J	2 J	1 J	2 J		0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l		70 U				70 U		
1,4-Dioxane (8270)	6.7	ug/l	2.2				2.6			
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U		1 U
cis-1,2-Dichloroethene	70	ug/l	14	0.8 U	5	11	10	8		0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U		2 U
Tetrachloroethene	5	ug/l	<b>190</b>	3 J	<b>69</b>	<b>150</b>	<b>150</b>	<b>140</b>		0.8 U
Trichloroethene	5	ug/l	<b>24</b>	1 U	<b>7</b>	<b>16</b>	<b>15</b>	<b>14</b>		1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U		1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW 73-01S 5/30/2013 GWWDUP	BW 79-02S 5/15/2012 GWW	BW 79-02S 11/8/2012 GWW	BW 79-02S 5/30/2013 GWW	BW CG-01D 5/10/2012 GWW	BW CG-01D 5/30/2013 GWW	BW CG-01D 5/30/2013 GWWDUP	BW CM-01S 4/3/2012 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	2.8			7.4		18000	17000	6900
1,3-Dinitrobenzene	1.6	ug/l						0.2 U	0.2 U	
RDX	6.1	ug/l						51	51	
1,1,1-Trichloroethane	200	ug/l	0.8 U	310	410	610	0.8 U	0.8 U	0.8 U	1 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	18	23	30	26	41	40	3 J
1,1-Dichloroethene	7	ug/l	0.8 U	110	120	150	0.8 U	0.8 U	0.8 U	3 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l				3.2		6.5 j	6.3	
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.6 J	1 J	0.9 J	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	2 J	3 J	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	1 J	4 J	4 J	5 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	8	9	8	44
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 J	1 J	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW CM-01S 5/31/2013 GWW	BW TTU-03D 4/4/2012 GWW	BW TTU-03D 4/4/2012 GWWDUP	BW TTU-03D 5/28/2013 GWW	SW 105-01 5/9/2012 GWW	SW 105-01 5/30/2013 GWW	SW 105-03D 4/3/2012 GWW	SW 105-03D 5/24/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l				<b>0.0063</b>				
Manganese, dissolved	0.38	mg/l		<b>1.3</b>	<b>1.29</b>	<b>1.42</b>				
Perchlorate in Water	15	ug/l	<b>4800</b>	<b>290</b>	<b>300</b>	<b>73</b>	<b>8700</b>	<b>46</b>	<b>8100</b>	<b>2300</b>
1,3-Dinitrobenzene	1.6	ug/l				0.2 U		0.2 U		
RDX	6.1	ug/l				0.2 U		0.2 U		
1,1,1-Trichloroethane	200	ug/l	0.8 U	2 J	2 J	0.8 U	2 J	0.8 U	2 J	2 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	2 J	4 J	4 J	2 J	1 J	1 U	1 J	1 J
1,1-Dichloroethene	7	ug/l	2 J	3 J	3 J	1 J	2 J	0.8 U	3 J	2 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	1 J	1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	2 J	260	270	270	4 J	0.8 U	6	4 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>23</b>	<b>790</b>	<b>750</b>	<b>360</b>	<b>34</b>	0.8 U	<b>42</b>	<b>35</b>
Trichloroethene	5	ug/l	1 U	<b>160</b>	<b>170</b>	<b>100</b>	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	<b>8</b>	<b>8</b>	2 J	1 U	1 U	1 U	1 U

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 115-01S 5/9/2012 GWW	SW 115-01S 5/24/2013 GWW	SW 15-02 5/11/2012 GWW	SW 15-02 5/24/2013 GWW	SW 15-02 5/24/2013 GWWDUP	SW 204-01 5/8/2012 GWW	SW 204-01 5/23/2013 GWW	SW 28-41 5/8/2012 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l						0.0107	0.0028 J	0.0053
Perchlorate in Water	15	ug/l	<b>17</b>	<b>26</b>	<b>200</b>	<b>110</b>	<b>96</b>		6.1	<b>760</b>
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l		0.8 U	<b>1700</b>	<b>4500</b>	<b>4400</b>	0.8 U	0.8 U	
1,1,2-Trichloroethane	5	ug/l		0.8 U	2 U	1 J	4 U	0.8 U	0.8 U	
1,1-Dichloroethane	120	ug/l		1 U	21	110	97	1 U	1 U	
1,1-Dichloroethene	7	ug/l		0.8 U	<b>120</b>	<b>400</b>	<b>370</b>	0.8 U	0.8 U	
1,2,3-Trichloropropane	0.0072	ug/l		1 U	2 U	1 U	5 U	1 U	1 U	
1,2-Dichloroethane	5	ug/l		1 U	2 U	2 J	5 U	1 U	1 U	
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l				<b>18 j</b>	0.05 U			
Benzene	5	ug/l		0.5 U	1 U	0.5 U	3 U	0.5 U	0.5 U	
Carbon Tetrachloride	5	ug/l		1 U	2 U	1 U	5 U	1 U	1 U	
Chloroethane		ug/l		1 U	2 U	5 j	7 J	1 U	1 U	
cis-1,2-Dichloroethene	70	ug/l		0.8 U	4 J	5 J	4 U	0.8 U	0.8 U	
Methylene Chloride	5	ug/l		2 U	4 U	2 U	10 U	2 U	2 U	
Tetrachloroethene	5	ug/l		0.8 U	<b>55</b>	<b>63</b>	<b>51</b>	0.8 U	0.8 U	
Trichloroethene	5	ug/l		1 U	<b>8 J</b>	<b>14</b>	<b>12 J</b>	1 U	1 J	
Vinyl Chloride	2	ug/l		1 U	2 U	1 U	5 U	1 U	1 U	

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 28-41 5/30/2013 GWW	SW 35-01S 5/28/2013 GWW	SW 40-06 5/30/2013 GWW	SW 40-07A 5/9/2012 GWW	SW 40-07A 5/28/2013 GWW	SW 40-51 5/16/2012 GWW	SW 40-51 5/31/2013 GWW	SW 40-57 5/8/2012 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l	0.00083 U							
Perchlorate in Water	15	ug/l	<b>570</b>	1 U	1.6	<b>700</b>	<b>560</b>		6	<b>18</b>
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	13	0.8 U	0.8 U	0.8 U	0.8 J	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	3 J	0.8 U	0.8 U	2 J	2 J	5 J	0.8 U	3 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	5	0.8 U	0.8 U	100	310	0.8 U	0.8 U	<b>240</b>
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>39</b>	0.8 U	3 J	<b>260</b>	<b>920</b>	4 J	0.8 U	<b>960</b>
Trichloroethene	5	ug/l	4 J	1 U	1 U	<b>18</b>	<b>60</b>	3 J	1 U	<b>91</b>
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	<b>3 J</b>	<b>10</b>	1 U	1 U	17

Notes:

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**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 40-57 5/29/2013 GWW	SW 42-02 5/16/2012 GWW	SW 42-02 5/31/2013 GWW	SW 46-01 5/16/2012 GWW	SW 46-01 5/30/2013 GWW	SW 47-02 5/16/2012 GWW	SW 47-02 5/31/2013 GWW	SW 47-02 5/31/2013 GWWDUP
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l	<b>33</b>		<b>940</b>		<b>820</b>		<b>460</b>	<b>460</b>
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	2 J	0.8 J	0.8 U	1 J	1 J	0.8 J	1 J	2 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 J
1,1-Dichloroethene	7	ug/l	4 J	4 J	4 J	2 J	2 J	1 J	2 J	2 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	<b>360</b>	1 J	0.8 U	37	35	2 J	3 J	4 J
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>1400</b>	3 J	3 J	<b>380</b>	<b>400</b>	<b>8</b>	<b>11</b>	<b>14</b>
Trichloroethene	5	ug/l	<b>120</b>	1 U	1 U	<b>26</b>	<b>21</b>	5 J	<b>6</b>	<b>6</b>
Vinyl Chloride	2	ug/l	17	1 U	1 U	1 U	1 U	1 U	1 U	1 U

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**TABLE 3**  
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**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 47-05 5/31/2013 GWW	SW 5-04 4/4/2012 GWW	SW 5-04 11/9/2012 GWW	SW 5-04 5/31/2013 GWW	SW 5-04 11/20/2013 GWW	SW 70-01 5/15/2012 GWW	SW 70-01 5/24/2013 GWW	SW 74-01 2/15/2012 GWW
Cadmium, dissolved	0.005	mg/l								0.00071 J
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l		0.0119		0.0177				
Perchlorate in Water	15	ug/l	1 U	<b>410</b>	<b>480</b>	<b>450</b>	<b>400</b>		<b>65</b>	
1,3-Dinitrobenzene	1.6	ug/l								
RDX	6.1	ug/l								
1,1,1-Trichloroethane	200	ug/l	0.8 U	<b>21000</b>	<b>32000</b>	<b>200000</b>	<b>60000</b>	3 J	2 J	
1,1,2-Trichloroethane	5	ug/l	0.8 U	4 J	40 U	80 U	40 U	0.8 U	0.8 U	
1,1-Dichloroethane	120	ug/l	2 J	<b>300</b>	<b>720</b>	<b>1600</b>	<b>180 J</b>	3 J	1 J	
1,1-Dichloroethene	7	ug/l	0.8 U	<b>220</b>	<b>540</b>	<b>3000</b>	<b>580</b>	0.8 U	0.8 U	
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	50 U	100 U	50 U	1 U	1 U	
1,2-Dichloroethane	5	ug/l	1 U	1 U	50 U	100 U	50 U	1 U	1 U	
1,4-Dioxane (8260)	6.7	ug/l					3500 U			
1,4-Dioxane (8270)	6.7	ug/l				3				
Benzene	5	ug/l	0.5 U	0.5 U	25 U	50 U	25 U	0.5 U	0.5 U	
Carbon Tetrachloride	5	ug/l	1 U	1 U	50 U	100 U	50 U	1 U	1 U	
Chloroethane		ug/l	1 U	18	70 J	110 J	55 J	1 U	1 U	
cis-1,2-Dichloroethene	70	ug/l	0.8 U	10	40 U	80 U	40 U	0.8 U	0.8 U	
Methylene Chloride	5	ug/l	2 U	2 U	100 U	200 U	100 U	2 U	2 U	
Tetrachloroethene	5	ug/l	0.8 U	<b>120</b>	<b>98 J</b>	80 U	<b>88 J</b>	0.8 U	0.8 U	
Trichloroethene	5	ug/l	3 J	<b>33</b>	50 U	<b>140 J</b>	55 J	1 U	1 U	
Vinyl Chloride	2	ug/l	1 U	1 U	50 U	100 U	50 U	1 U	1 U	

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**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 74-02 5/15/2012 GWW	SW 74-02 5/15/2012 GWWDUP	SW 74-02 5/31/2013 GWW	SW 74-06 5/14/2012 GWW	SW 74-06 5/31/2013 GWW	SW 74-07 5/14/2012 GWW	SW 74-07 5/14/2012 GWWDUP	SW 74-07 5/31/2013 GWW
Cadmium, dissolved	0.005	mg/l								
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l								
Perchlorate in Water	15	ug/l			<b>160</b>	<b>110</b>	<b>85</b>	<b>130</b>	<b>130</b>	<b>150 j</b>
1,3-Dinitrobenzene	1.6	ug/l			0.2 U					0.2 U
RDX	6.1	ug/l			<b>12</b>					<b>22</b>
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	2 J	2 J	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	7	7	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U	0.8 U	2 J	2 J	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l								
1,4-Dioxane (8270)	6.7	ug/l								0.051 U
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	11	10	4 J	32	31	53	52	65
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	<b>280</b>	<b>280</b>	<b>59</b>	<b>180</b>	<b>140</b>	<b>640</b>	<b>610</b>	<b>620</b>
Trichloroethene	5	ug/l	<b>8</b>	<b>8</b>	4 J	<b>44</b>	<b>45</b>	<b>26</b>	<b>26</b>	<b>28</b>
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 3**  
**Analytical Data for Plume Area Shallow Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW 74-07 5/31/2013 GWWDUP	SW CM-05 4/4/2012 GWW
Cadmium, dissolved	0.005	mg/l		
Cobalt, dissolved	0.0047	mg/l		
Manganese, dissolved	0.38	mg/l		0.115
Perchlorate in Water	15	ug/l	<b>210</b>	
1,3-Dinitrobenzene	1.6	ug/l	0.2 U	
RDX	6.1	ug/l	<b>22</b>	
1,1,1-Trichloroethane	200	ug/l	0.8 U	1 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l		
1,4-Dioxane (8270)	6.7	ug/l	0.055 U	
Benzene	5	ug/l	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U
Chloroethane		ug/l	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	65	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U
Tetrachloroethene	5	ug/l	<b>660</b>	0.8 U
Trichloroethene	5	ug/l	<b>28</b>	1 U
Vinyl Chloride	2	ug/l	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 4**  
**Analytical Data for Plume Area Shallow Sampling Locations - PCBs Only**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Units	SW 40-51 5/31/2013 GWW	SW 5-04 5/31/2013 GWW
PCB1	pg/l	119 Bj	12600 Bj
PCB10	pg/l	653 j	4070 j
PCB103	pg/l	54 Jj	128 j
PCB104	pg/l	23.3 U	13.5 U
PCB105	pg/l	6940 j	6120 j
PCB106	pg/l	28.3 U	26 Jj
PCB107	pg/l	870 j	766 j
PCB108+124	pg/l	420 j	399 j
PCB11	pg/l	112 JBj	403 Bj
PCB110+115	pg/l	10900 j	13000 j
PCB111	pg/l	23.3 U	13.5 U
PCB112	pg/l	23.3 U	13.5 U
PCB114	pg/l	540 j	525 j
PCB118	pg/l	11600 j	8400 j
PCB12+13	pg/l	91 j	4640 j
PCB120	pg/l	21.7 U	12.5 U
PCB121	pg/l	20 U	11.6 U
PCB122	pg/l	218 j	236 j
PCB123	pg/l	384 j	301 j
PCB126	pg/l	40 Jj	41 Jj
PCB127	pg/l	23.3 U	13.5 U
PCB128+166	pg/l	383 j	178 j
PCB129+138+163	pg/l	2300 j	1010 j
PCB130	pg/l	145 j	76 j
PCB131	pg/l	28.3 U	31 Jj
PCB132	pg/l	620 j	464 j
PCB133	pg/l	27 Jj	12 Jj
PCB134	pg/l	121 Jj	95 Jj
PCB135+151	pg/l	481 j	387 j
PCB136	pg/l	144 j	190 j
PCB137	pg/l	115 j	78 j
PCB139+140	pg/l	48.3 U	33 Jj
PCB14	pg/l	13.3 U	7.72 U
PCB141	pg/l	274 j	224 j
PCB142	pg/l	28.3 U	16.4 U
PCB143	pg/l	55 U	31.9 U
PCB144	pg/l	51 Jj	65 j
PCB145	pg/l	26.7 U	15.4 U
PCB146	pg/l	239 j	126 j
PCB147+149	pg/l	1350 j	886 j
PCB148	pg/l	23.3 U	13.5 U
PCB15	pg/l	3260 Bj	56400 Bj
PCB150	pg/l	25 U	14.5 U
PCB152	pg/l	23.3 U	13.5 U
PCB153+168	pg/l	1250 j	618 j



**TABLE 4**  
**Analytical Data for Plume Area Shallow Sampling Locations - PCBs Only**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Units	SW 40-51 5/31/2013 GWW	SW 5-04 5/31/2013 GWW
PCB154	pg/l	76.7 U	44.4 U
PCB155	pg/l	23.3 U	13.5 U
PCB156+157	pg/l	304 j	146 j
PCB158	pg/l	179 j	123 j
PCB159	pg/l	23.3 U	13.5 U
PCB16	pg/l	286 Bj	26100 Bj
PCB160	pg/l	105 U	60.8 U
PCB161	pg/l	21.7 U	12.5 U
PCB162	pg/l	21.7 U	12.5 U
PCB164	pg/l	153 j	72 j
PCB165	pg/l	21.7 U	12.5 U
PCB167	pg/l	81 Jj	37 Jj
PCB169	pg/l	25 U	14.5 U
PCB17	pg/l	614 Bj	29900 Bj
PCB170	pg/l	141 j	82 j
PCB171+173	pg/l	50 U	31 Jj
PCB172	pg/l	27 Jj	18 Jj
PCB174	pg/l	200 j	159 j
PCB175	pg/l	23.3 U	13.5 U
PCB176	pg/l	20 U	19 Jj
PCB177	pg/l	93 j	69 j
PCB178	pg/l	45 Jj	33 Jj
PCB179	pg/l	86 j	80 j
PCB18+30	pg/l	798 Bj	49900 Bj
PCB180+193	pg/l	281 j	281 j
PCB181	pg/l	21.7 U	12.5 U
PCB182	pg/l	21.7 U	12.5 U
PCB183	pg/l	95 Jj	83 Jj
PCB184	pg/l	23.3 U	13.5 U
PCB185	pg/l	46.7 U	27 U
PCB186	pg/l	25 U	14.5 U
PCB187	pg/l	256 j	199 j
PCB188	pg/l	25 U	14.5 U
PCB189	pg/l	21.7 U	12.5 U
PCB19	pg/l	3880 j	18600 j
PCB190	pg/l	35 Jj	19 Jj
PCB191	pg/l	21.7 U	12.5 U
PCB192	pg/l	21.7 U	12.5 U
PCB194	pg/l	81 Jj	70 j
PCB195	pg/l	36.7 U	27 Jj
PCB196	pg/l	39 Jj	43 Jj
PCB197	pg/l	71.7 U	41.5 U
PCB198+199	pg/l	268 j	117 j
PCB2	pg/l	11.7 U	543 j
PCB20+28	pg/l	42900 j	210000 j



**TABLE 4**  
**Analytical Data for Plume Area Shallow Sampling Locations - PCBs Only**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Units	SW 40-51 5/31/2013 GWW	SW 5-04 5/31/2013 GWW
PCB200	pg/l	71.7 U	41.5 U
PCB201	pg/l	33.3 U	19.3 U
PCB202	pg/l	81 Jj	29 Jj
PCB203	pg/l	149 j	66 j
PCB204	pg/l	35 U	20.3 U
PCB205	pg/l	25 U	14.5 U
PCB206	pg/l	225 j	43 Jj
PCB207	pg/l	31.7 U	18.3 U
PCB208	pg/l	127 j	15 Jj
PCB209	pg/l	61 Jj	15.4 U
PCB21+33	pg/l	422 j	28600 j
PCB22	pg/l	10700 j	63900 j
PCB23	pg/l	11.7 U	193 j
PCB24	pg/l	270 j	2590 j
PCB25	pg/l	799 j	8390 j
PCB26+29	pg/l	2600 j	21200 j
PCB27	pg/l	1660 j	8950 j
PCB3	pg/l	114 j	3080 j
PCB31	pg/l	27800 j	112000 j
PCB32	pg/l	9790 j	40700 j
PCB34	pg/l	21 Jj	442 j
PCB35	pg/l	111 j	1870 j
PCB36	pg/l	13.3 U	7.72 U
PCB37	pg/l	10700 j	55800 j
PCB38	pg/l	11.7 U	65 j
PCB39	pg/l	40 j	434 j
PCB4	pg/l	306 Bj	40000 Bj
PCB40+71	pg/l	5730 j	41300 j
PCB41	pg/l	656 j	11100 j
PCB42	pg/l	3870 j	26200 j
PCB43	pg/l	307 j	4220 j
PCB44+47+65	pg/l	13600 j	84200 j
PCB45	pg/l	2280 j	22300 j
PCB46	pg/l	492 j	8510 j
PCB48	pg/l	1470 j	16500 j
PCB49+69	pg/l	17100 j	50700 j
PCB5	pg/l	13.3 U	1430 j
PCB50+53	pg/l	2910 j	16400 j
PCB51	pg/l	441 j	4310 j
PCB52	pg/l	27600 j	75800 j
PCB54	pg/l	35 Jj	367 j
PCB55	pg/l	419 j	1620 j
PCB56	pg/l	14300 j	33400 j
PCB57	pg/l	111 j	442 j
PCB58	pg/l	37 Jj	123 j



**TABLE 4**  
**Analytical Data for Plume Area Shallow Sampling Locations - PCBs Only**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Units	SW 40-51 5/31/2013 GWW	SW 5-04 5/31/2013 GWW
PCB59+62+75	pg/l	1990 j	9460 j
PCB6	pg/l	83 Bj	10300 Bj
PCB60	pg/l	10200 j	21500 j
PCB61+70+74+76	pg/l	59400 j	109000 j
PCB63	pg/l	1500 j	2690 j
PCB64	pg/l	16600 j	40400 j
PCB66	pg/l	39400 j	60400 j
PCB67	pg/l	797 j	2670 j
PCB68	pg/l	123 j	196 j
PCB7	pg/l	17 Jj	2360 j
PCB72	pg/l	128 j	271 j
PCB73	pg/l	23.3 U	13.5 U
PCB77	pg/l	2870 j	5380 j
PCB78	pg/l	26.7 U	15.4 U
PCB79	pg/l	93 j	161 j
PCB8	pg/l	443 Bj	45000 Bj
PCB80	pg/l	18.3 U	10.6 U
PCB81	pg/l	170 j	372 j
PCB82	pg/l	1580 j	3180 j
PCB83	pg/l	48.3 U	1110 j
PCB84	pg/l	1480 j	6530 j
PCB85+116+117	pg/l	3410 j	3780 j
PCB86+87+97+109+119+125	pg/l	7890 j	11100 j
PCB88	pg/l	36.7 U	21.2 U
PCB89	pg/l	129 j	758 j
PCB9	pg/l	25 Jj	3940 j
PCB90+101+113	pg/l	8690 j	10200 j
PCB91	pg/l	1570 j	3360 j
PCB92	pg/l	1430 j	1860 j
PCB93+100	pg/l	128 U	362 j
PCB94	pg/l	69 Jj	217 j
PCB95	pg/l	5230 j	11000 j
PCB96	pg/l	51 Jj	500 j
PCB98+102	pg/l	438 j	1320 j
PCB99	pg/l	5670 j	5790 j

Notes:

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank

See data validation memoranda for additional qualifier details.

ug/l = micrograms per liter; mg/l = milligrams per liter

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample



**TABLE 5**  
**Analytical Data for Surface Water Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	STR 02 5/17/2012 SW	STR 04 5/17/2012 SW	STR 04 5/29/2013 SW	STR 04 11/19/2013 SW	STR 40-15 5/17/2012 SW	STR 40-15 5/29/2013 SW
			Boundary	Boundary	Boundary	Boundary	Non-Boundary	Non-Boundary
Perchlorate in Water	600	ug/l	0.2 U	9.5	14	21		15
1,3-Dinitrobenzene	22	ug/l			0.2 U			0.2 U
RDX	360	ug/l			0.2 U			0.2 U
PCB-1016	0.014 Total	ug/l			0.087 U			0.085 U
PCB-1221		ug/l			0.087 U			0.085 U
PCB-1232		ug/l			0.17 U			0.17 U
PCB-1242		ug/l			0.087 U			0.085 U
PCB-1248		ug/l			0.087 U			0.085 U
PCB-1254		ug/l			0.087 U			0.085 U
PCB-1260		ug/l			0.13 U			0.13 U
1,1,1-Trichloroethane	11	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	1200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	47	ug/l	2 J	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	25	ug/l	2 J	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	--	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	100	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	22000	ug/l				70 U		
1,4-Dioxane (8270)	22000	ug/l			0.55			
Benzene	370	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	13.3	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	--	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	--	ug/l	0.8 U	2 J	0.8 U	0.9 J	1 J	65
Methylene Chloride	98.1	ug/l	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	111	ug/l	0.8 U	2 J	1 J	3 J	0.8 U	34
Trichloroethene	21	ug/l	3 J	1 U	1 U	1 U	1 U	8
Vinyl Chloride	930	ug/l	1 U	1 U	1 U	1 U	1 U	2 J

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

Surface water screening levels are chosen based on the following hierarchy: 1) Chronic Virginia AWQS (Ambient Water Quality Standards), 2) Acute Virginia AWQS, 3) USEPA Region 3 AWQS and 4) USEPA Region 5 AWQS.



**TABLE 5**  
**Analytical Data for Surface Water Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	STR 40-25 5/17/2012 SW	STR 40-25 5/30/2013 SW	STR 40-27 5/17/2012 SW	STR 40-27 5/30/2013 SW	West 01 5/30/2013 SW
			Non-Boundary	Non-Boundary	Non-Boundary	Non-Boundary	Non-Boundary
Perchlorate in Water	600	ug/l		1 U		1 U	<b>1800</b>
1,3-Dinitrobenzene	22	ug/l		0.2 U		0.2 U	0.2 U
RDX	360	ug/l		0.2 U		0.2 U	2.6
PCB-1016	0.014 Total	ug/l		0.089 U		0.082 U	0.083 U
PCB-1221		ug/l		0.089 U		0.082 U	0.083 U
PCB-1232		ug/l		0.18 U		0.16 U	0.17 U
PCB-1242		ug/l		0.089 U		0.082 U	0.083 U
PCB-1248		ug/l		0.089 U		0.082 U	0.083 U
PCB-1254		ug/l		0.089 U		0.082 U	0.083 U
PCB-1260		ug/l		0.13 U		0.12 U	0.13 U
1,1,1-Trichloroethane	11	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	1200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	47	ug/l	1 U	1 U	1 U	1 U	3 J
1,1-Dichloroethene	25	ug/l	1 J	0.8 J	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	--	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	100	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	22000	ug/l					
1,4-Dioxane (8270)	22000	ug/l					
Benzene	370	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	13.3	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane	--	ug/l	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	--	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	98.1	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	111	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	21	ug/l	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	930	ug/l	1 U	1 U	1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

Surface water screening levels are chosen based on the following hierarchy: 1) Chronic Virginia AWQS (Ambient Water Quality Standards), 2) Acute Virginia AWQS, 3) USEPA Region 3 AWQS and 4) USEPA Region 5 AWQS.



**TABLE 6**  
**Analytical Data for Thermal Treatment Facility Area Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	BW TTU-02D 3/29/2012 GWW	BW TTU-05 5/7/2012 GWWDUP	BW TTU-05 5/10/2012 GWW	BW TTU-05 11/8/2012 GWW	BW TTU-05 5/28/2013 GWW	BW TTU-05 5/28/2013 GWWDUP	SW TTU-03 5/10/2012 GWW	SW TTU-03 11/9/2012 GWW
Cobalt, dissolved	0.0047	mg/l								
Manganese, dissolved	0.38	mg/l					0.165	0.15		
Perchlorate in Water	15	ug/l	<b>2800</b>	<b>4600</b>	<b>4700</b>	<b>8000</b>	<b>1500</b>	<b>1400</b>	<b>980</b>	<b>4200</b>
1,3-Dinitrobenzene	1.6	ug/l	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	
RDX	6.1	ug/l	0.2 U	0.75 U	0.83	0.2 U	0.23 J	0.27 J	0.2 U	
PCB-1016	0.5 Total	ug/l					0.083 U	0.085 U		
PCB-1221		ug/l					0.083 U	0.085 U		
PCB-1232		ug/l					0.17 U	0.17 U		
PCB-1242		ug/l					0.083 U	0.085 U		
PCB-1248		ug/l					0.083 U	0.085 U		
PCB-1254		ug/l					0.083 U	0.085 U		
PCB-1260		ug/l					0.12 U	0.13 U		
1,1,1-Trichloroethane	200	ug/l	0.8 U	3 J	3 J	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	0.8 U	2 J	2 J	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	6.7	ug/l								
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	3 J	5 J	5 J	1 J	0.9 J	0.9 J	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 6**  
**Analytical Data for Thermal Treatment Facility Area Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	SW TTU-03 5/29/2013 GWW	SW TTU-03 11/20/2013 GWW	SW TTU-05 5/10/2012 GWW	SW TTU-05 11/8/2012 GWW	SW TTU-05 5/28/2013 GWW
Cobalt, dissolved	0.0047	mg/l					0.0152
Manganese, dissolved	0.38	mg/l					<b>1.61</b>
Perchlorate in Water	15	ug/l	<b>26000</b>	<b>3800</b>	1.1	1.5	2.1
1,3-Dinitrobenzene	1.6	ug/l	0.2 U		0.2 U	0.2 U	0.2 U
RDX	6.1	ug/l	0.39 J		0.2 U	0.2 U	0.2 U
PCB-1016	0.5 Total	ug/l	0.089 U				0.082 U
PCB-1221		ug/l	0.089 U				0.082 U
PCB-1232		ug/l	0.18 U				0.16 U
PCB-1242		ug/l	0.089 U				0.082 U
PCB-1248		ug/l	0.089 U				0.082 U
PCB-1254		ug/l	0.089 U				0.082 U
PCB-1260		ug/l	0.13 U				0.12 U
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	6.7	ug/l		70 U			
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	1 U	1 U	1 U	1 U	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-13 MID 2/27/2012 GWW	DW-13 MID 5/9/2012 GWW	DW-13 MID 8/16/2012 GWW	DW-13 MID 11/6/2012 GWW	DW-13 MID 5/28/2013 GWW
Chloride		mg/l					
Chloride, dissolved		mg/l					
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l					
Sulfate, dissolved		mg/l					
Ethane (175 modified)		ug/l					
Ethene (175 modified)		ug/l					
Methane		ug/l					
Sulfide		mg/l					
Sulfide		mg/l					
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l					
Manganese, dissolved	0.38	mg/l					
Perchlorate in Water	15	ug/l				<b>1600</b>	
Ethane (8015)		ug/l					
Ethene (8015)		ug/l					
Methane		ug/l					
1,3-Dinitrobenzene	1.6	ug/l					
RDX	6.1	ug/l					
1,1,1-Trichloroethane	200	ug/l	74	63	66		70
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l	39	42	44		49
1,1-Dichloroethene	7	ug/l	<b>180</b>	<b>200</b>	<b>180</b>		<b>170</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U		1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l	70 U				
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U		1 U
Chloroethane		ug/l	1 U	1 U	1 U		1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U		0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U		2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U		1 J
Trichloroethene	5	ug/l	1 U	1 U	1 U		1 J
Vinyl Chloride	2	ug/l	<b>5 J</b>	<b>4 J</b>	<b>3 J</b>		<b>3 J</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-13 2/27/2012 GWW	DW-13 2/27/2012 GWWDUP	DW-13 5/9/2012 GWW	DW-13 5/9/2012 GWWDUP	DW-13 5/24/2012 GWW
Chloride		mg/l					
Chloride, dissolved		mg/l	15.3	16.5	26.1	18	
Fluoride, dissolved	0.63	mg/l	0.4 U	0.4 U			
Sulfate		mg/l					
Sulfate, dissolved		mg/l	208	217	250	232	
Ethane (175 modified)		ug/l					
Ethene (175 modified)		ug/l					
Methane		ug/l					
Sulfide		mg/l					
Sulfide		mg/l	0.054 U	0.054 U	0.054 U	0.054 U	
Total Organic Carbon		mg/l					0.5 U
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l			0.0166 J	0.0141 U	
Manganese, dissolved	0.38	mg/l			0.143	0.142	
Perchlorate in Water	15	ug/l	<b>2400</b>	<b>2600</b>	<b>2300</b>	<b>1700</b>	
Ethane (8015)		ug/l	1 U	1 U	1 U	1 U	
Ethene (8015)		ug/l	3.3 J	3.4 J	2.4 J	2 J	
Methane		ug/l	3900	3800	2900	2800	
1,3-Dinitrobenzene	1.6	ug/l					
RDX	6.1	ug/l					
1,1,1-Trichloroethane	200	ug/l	66	69	50	56	
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	
1,1-Dichloroethane	120	ug/l	38	40	38	42	
1,1-Dichloroethene	7	ug/l	<b>150</b>	<b>160</b>	<b>150</b>	<b>160</b>	
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	
1,4-Dioxane (8260)	6.7	ug/l	70 U	70 U			
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	
Chloroethane		ug/l	1 U	1 U	1 U	1 U	
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	
Tetrachloroethene	5	ug/l	<b>27</b>	<b>27</b>	<b>26</b>	<b>27</b>	
Trichloroethene	5	ug/l	3 J	3 J	2 J	2 J	
Vinyl Chloride	2	ug/l	<b>4 J</b>	<b>5 J</b>	<b>4 J</b>	<b>4 J</b>	

Notes:

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GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-13 7/23/2012 GWW	DW-13 8/16/2012 GWW	DW-13 8/16/2012 GWWDUP	DW-13 11/6/2012 GWW	DW-13 11/6/2012 GWWDUP
Chloride		mg/l		15.7	15.8	7.7	7.8
Chloride, dissolved		mg/l					
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l		207	227	47.6	47.4
Sulfate, dissolved		mg/l					
Ethane (175 modified)		ug/l					
Ethene (175 modified)		ug/l					
Methane		ug/l					
Sulfide		mg/l					
Sulfide		mg/l		0.054 U	0.054 U	0.054 U	0.054 U
Total Organic Carbon		mg/l	0.62 J			0.5 U	
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l					
Manganese, dissolved	0.38	mg/l					
Perchlorate in Water	15	ug/l		<b>3000</b>	<b>2400</b>	<b>500</b>	<b>550</b>
Ethane (8015)		ug/l		1 U	1 U	1.3 J	1.3 J
Ethene (8015)		ug/l		1.5 J	2 J	2.1 J	2.3 J
Methane		ug/l		2600	3500	3900	3900
1,3-Dinitrobenzene	1.6	ug/l					
RDX	6.1	ug/l					
1,1,1-Trichloroethane	200	ug/l		51	56	100	100
1,1,2-Trichloroethane	5	ug/l		0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l		42	43	33	36
1,1-Dichloroethene	7	ug/l		<b>130</b>	<b>150</b>	<b>230</b>	<b>250</b>
1,2,3-Trichloropropane	0.0072	ug/l		1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l		1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l					
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l		0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l		1 U	1 U	1 U	1 U
Chloroethane		ug/l		1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l		0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l		2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l		<b>24</b>	<b>28</b>	<b>47</b>	<b>43</b>
Trichloroethene	5	ug/l		3 J	3 J	2 J	2 J
Vinyl Chloride	2	ug/l		<b>3 J</b>	<b>3 J</b>	<b>3 J</b>	<b>3 J</b>

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**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-13 5/28/2013 GWW	DW-13 5/28/2013 GWWDUP	DW-22 5/9/2012 GWW	DW-22 5/9/2012 GWWDUP	DW-22 11/6/2012 GWW
Chloride		mg/l					15.5
Chloride, dissolved		mg/l	16.4	16.2	28.1	20.3	
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l					1.6 J
Sulfate, dissolved		mg/l	213	212	94.5	89.6	
Ethane (175 modified)		ug/l	1 U				
Ethene (175 modified)		ug/l	1.4 J				
Methane		ug/l	6300				
Sulfide		mg/l	0.054 U	0.054 U			
Sulfide		mg/l			0.12 J	0.14 J	4.4
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l	0.00066 U				
Iron, dissolved	11	mg/l	0.0333 U	0.0333 U	0.198 J	0.181 J	
Manganese, dissolved	0.38	mg/l	0.191	0.192	<b>1.8</b>	<b>1.82</b>	
Perchlorate in Water	15	ug/l	<b>1900</b>		0.2 U		0.2 U
Ethane (8015)		ug/l			1 U		1 U
Ethene (8015)		ug/l			14		14
Methane		ug/l			3400		10000
1,3-Dinitrobenzene	1.6	ug/l	0.2 U		0.2 U		
RDX	6.1	ug/l	0.2 U		0.2 U		
1,1,1-Trichloroethane	200	ug/l	57		0.8 U		0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U		0.8 U		0.8 U
1,1-Dichloroethane	120	ug/l	46		76		74
1,1-Dichloroethene	7	ug/l	<b>150</b>		4 J		2 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U		1 U		1 U
1,2-Dichloroethane	5	ug/l	1 U		1 U		1 U
1,4-Dioxane (8260)	6.7	ug/l					
1,4-Dioxane (8270)	6.7	ug/l	7.3				
Benzene	5	ug/l	0.5 U		0.5 U		0.5 U
Carbon Tetrachloride	5	ug/l	1 U		1 U		1 U
Chloroethane		ug/l	1 U		1 U		4 J
cis-1,2-Dichloroethene	70	ug/l	0.8 U		0.8 U		0.8 U
Methylene Chloride	5	ug/l	2 U		2 U		2 U
Tetrachloroethene	5	ug/l	<b>34</b>		0.8 U		0.8 U
Trichloroethene	5	ug/l	3 J		1 U		1 U
Vinyl Chloride	2	ug/l	<b>3 J</b>		<b>3 J</b>		<b>3 J</b>

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The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-22 5/28/2013 GWW	DW-22 11/19/2013 GWW	DW-28DD 5/10/2012 GWW	DW-28DD 5/28/2013 GWW	DW-28DD 5/28/2013 GWWDUP
Chloride		mg/l					
Chloride, dissolved		mg/l	16.7		18.8	17.2	16.9
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l					
Sulfate, dissolved		mg/l	36.7		84	40	42.8
Ethane (175 modified)		ug/l	1 U			1 U	1 U
Ethene (175 modified)		ug/l	13			2.6 J	2.6 J
Methane		ug/l	9200			10000	11000
Sulfide		mg/l	0.87			0.054 U	0.054 U
Sulfide		mg/l			0.054 U		
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l	0.131 J		0.159 J	0.114 J	0.119 J
Manganese, dissolved	0.38	mg/l	<b>1.47</b>		<b>0.859</b>	<b>0.636</b>	<b>0.623</b>
Perchlorate in Water	15	ug/l	1 U	<b>290</b>	0.2 U	1 U	1 U
Ethane (8015)		ug/l			1 U		
Ethene (8015)		ug/l			6		
Methane		ug/l			3500		
1,3-Dinitrobenzene	1.6	ug/l	0.2 U				
RDX	6.1	ug/l	0.2 U				
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	1 J	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	70	4 J	67	64	61
1,1-Dichloroethene	7	ug/l	3 J	4 J	5	4 J	4 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l		70 U			
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	10	1 U	2 J	12	11
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	2 J	1 J	1 J
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 J	1 J
Vinyl Chloride	2	ug/l	<b>3 J</b>	1 U	<b>3 J</b>	2 J	2 J

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**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-28DD 11/19/2013 GWW	DW-29D 5/10/2012 GWW	DW-29D 5/28/2013 GWW	DW-29D 11/19/2013 GWW	DW-29I 5/10/2012 GWW
Chloride		mg/l					
Chloride, dissolved		mg/l		19	15.6		21.4
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l					
Sulfate, dissolved		mg/l		175	38.8		112
Ethane (175 modified)		ug/l			1 U		
Ethene (175 modified)		ug/l			4.8 J		
Methane		ug/l			7700		
Sulfide		mg/l			0.095 J		
Sulfide		mg/l		0.088 J			0.054 U
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l		0.033 J	0.0514 J		0.227
Manganese, dissolved	0.38	mg/l		<b>1.15</b>	<b>0.722</b>		0.311
Perchlorate in Water	15	ug/l	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Ethane (8015)		ug/l		1 U			1 U
Ethene (8015)		ug/l		14			6.8
Methane		ug/l		3300			2800
1,3-Dinitrobenzene	1.6	ug/l					0.2 U
RDX	6.1	ug/l					0.2 U
1,1,1-Trichloroethane	200	ug/l	0.9 J	0.8 U	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	13	74	70	43	74
1,1-Dichloroethene	7	ug/l	0.9 J	2 J	2 J	0.8 U	<b>19</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l	70 U			70 U	
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 J	7	6	2 J
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	1 J	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 J	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	<b>9</b>	<b>4 J</b>	<b>3 J</b>	1 J	<b>9</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-29I 5/28/2013 GWW	DW-29I 11/19/2013 GWW	DW-35 Zone 5 5/8/2012 GWW	DW-35 Zone 8 5/8/2012 GWW	DW-36D 2/27/2012 GWW
Chloride		mg/l			17.9	16.5	
Chloride, dissolved		mg/l	16.1				16
Fluoride, dissolved	0.63	mg/l					0.4 U
Sulfate		mg/l			83.2	231	
Sulfate, dissolved		mg/l	90.8				119
Ethane (175 modified)		ug/l	1 U				
Ethene (175 modified)		ug/l	6				
Methane		ug/l	1900				
Sulfide		mg/l	0.15 J				
Sulfide		mg/l			5.3	0.061 J	11.5
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l	0.331		0.0141 U	0.0141 U	
Manganese, dissolved	0.38	mg/l	0.27		0.125	0.151	
Perchlorate in Water	15	ug/l	1 U	0.2 U	0.3 J	<b>900</b>	0.2 U
Ethane (8015)		ug/l			1 U	1 U	1 U
Ethene (8015)		ug/l			19	1.6 J	22
Methane		ug/l			1800	1200	4300
1,3-Dinitrobenzene	1.6	ug/l	0.2 U				
RDX	6.1	ug/l	0.2 U				
1,1,1-Trichloroethane	200	ug/l	0.8 U	0.8 U	0.8 U	58	2 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	57	53	100	52	86
1,1-Dichloroethene	7	ug/l	2 J	1 J	0.8 U	<b>150</b>	5 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l		70 U			70 U
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	4 J	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	<b>7</b>	<b>3 J</b>	<b>5</b>	<b>5 J</b>	<b>24</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-36D 5/9/2012 GWW	DW-36D 8/16/2012 GWW	DW-36D 11/6/2012 GWW	DW-36D 5/28/2013 GWW	DW-36D 11/19/2013 GWW
Chloride		mg/l		15.5	17		
Chloride, dissolved		mg/l	18.5			17.2	
Fluoride, dissolved	0.63	mg/l					
Sulfate		mg/l		15.8	1.5 U		
Sulfate, dissolved		mg/l	160			66.9	
Ethane (175 modified)		ug/l				1 U	
Ethene (175 modified)		ug/l				26	
Methane		ug/l				7900	
Sulfide		mg/l				7.9	
Sulfide		mg/l	2.9	14.4	0.62		
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l	0.0141 U			0.0333 U	
Manganese, dissolved	0.38	mg/l	<b>2.1</b>			<b>1.79</b>	
Perchlorate in Water	15	ug/l	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Ethane (8015)		ug/l	1 U	1 U	4.4 J		
Ethene (8015)		ug/l	23	23	17		
Methane		ug/l	2500	14000	23000		
1,3-Dinitrobenzene	1.6	ug/l				0.2 U	
RDX	6.1	ug/l				0.2 U	
1,1,1-Trichloroethane	200	ug/l	1 J	2 J	0.8 U	0.8 U	0.8 U
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	83	82	20	64	11
1,1-Dichloroethene	7	ug/l	1 J	1 J	0.8 U	0.8 U	0.9 J
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l					70 U
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	6	38	18	33
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	<b>7</b>	<b>8</b>	1 U	<b>3 J</b>	1 U

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-36DD 2/27/2012 GWW	DW-36DD 5/9/2012 GWW	DW-36DD 8/16/2012 GWW	DW-36DD 11/6/2012 GWW	DW-36DD 5/28/2013 GWW
Chloride		mg/l			15.2	13	
Chloride, dissolved		mg/l	16.8	17			18.2
Fluoride, dissolved	0.63	mg/l	0.4 U				
Sulfate		mg/l			105	1.5 U	
Sulfate, dissolved		mg/l	186	209			93.2
Ethane (175 modified)		ug/l					1 U
Ethene (175 modified)		ug/l					14
Methane		ug/l					6200
Sulfide		mg/l					44.2
Sulfide		mg/l	10.8	0.63	28.1		
Total Organic Carbon		mg/l					
Cobalt, dissolved	0.0047	mg/l					
Iron, dissolved	11	mg/l		0.0141 U			0.0333 U
Manganese, dissolved	0.38	mg/l		0.251			<b>0.46</b>
Perchlorate in Water	15	ug/l	<b>39</b>	<b>48</b>	0.98 J	0.2 U	1 U
Ethane (8015)		ug/l	1 U	1 U	1 U	5.3	
Ethene (8015)		ug/l	6.1	5.3	8.9	26	
Methane		ug/l	3800	3500	8700	30000	
1,3-Dinitrobenzene	1.6	ug/l					
RDX	6.1	ug/l					
1,1,1-Trichloroethane	200	ug/l	53	45	27	0.8 U	4 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1-Dichloroethane	120	ug/l	53	54	65	68	89
1,1-Dichloroethene	7	ug/l	<b>140</b>	<b>150</b>	<b>99</b>	0.8 U	<b>40</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane (8260)	6.7	ug/l	70 U				
1,4-Dioxane (8270)	6.7	ug/l					
Benzene	5	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U	1 U
Chloroethane		ug/l	1 U	1 U	1 J	18	4 J
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	1 J
Trichloroethene	5	ug/l	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	ug/l	<b>15</b>	<b>10</b>	<b>14</b>	1 U	<b>24</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



**TABLE 7**  
**Analytical Data for NDTs Performance Monitoring Well Sampling Locations**  
**Atlantic Research Corporation, Gainesville, Virginia**

Compound	Screening Levels	Units	DW-36DD 11/19/2013 GWW	DW-72B 5/10/2012 GWW	DW-72B 5/28/2013 GWW	DW-72B 11/20/2013 GWW
Chloride		mg/l				
Chloride, dissolved		mg/l		30.7	4.1	
Fluoride, dissolved	0.63	mg/l				
Sulfate		mg/l				
Sulfate, dissolved		mg/l		42.2	14.3	
Ethane (175 modified)		ug/l			1 U	
Ethene (175 modified)		ug/l			44	
Methane		ug/l			2400	
Sulfide		mg/l			0.054 U	
Sulfide		mg/l		0.054 U		
Total Organic Carbon		mg/l				
Cobalt, dissolved	0.0047	mg/l				
Iron, dissolved	11	mg/l		0.822	1.54	
Manganese, dissolved	0.38	mg/l		<b>1.07</b>	<b>0.885</b>	
Perchlorate in Water	15	ug/l	0.2 U	0.2 U	1 U	0.2 U
Ethane (8015)		ug/l		1 U		
Ethene (8015)		ug/l		86		
Methane		ug/l		5500		
1,3-Dinitrobenzene	1.6	ug/l		0.2 U	0.2 U	
RDX	6.1	ug/l		0.25 U	0.2 U	
1,1,1-Trichloroethane	200	ug/l	0.8 U	5	2 J	2 J
1,1,2-Trichloroethane	5	ug/l	0.8 U	3 J	0.9 J	1 J
1,1-Dichloroethane	120	ug/l	5 J	<b>150</b>	71	61
1,1-Dichloroethene	7	ug/l	0.8 U	<b>340</b>	<b>130</b>	<b>280</b>
1,2,3-Trichloropropane	0.0072	ug/l	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	ug/l	1 U	<b>6</b>	3 J	3 J
1,4-Dioxane (8260)	6.7	ug/l	70 U			<b>73 J</b>
1,4-Dioxane (8270)	6.7	ug/l			<b>89 j</b>	
Benzene	5	ug/l	0.5 U	<b>11</b>	<b>5 J</b>	3 J
Carbon Tetrachloride	5	ug/l	1 U	1 U	1 U	1 U
Chloroethane		ug/l	29	2 J	1 U	1 U
cis-1,2-Dichloroethene	70	ug/l	0.8 U	0.9 J	0.8 U	0.8 U
Methylene Chloride	5	ug/l	2 U	2 U	2 U	2 U
Tetrachloroethene	5	ug/l	0.8 U	1 J	0.8 U	0.8 U
Trichloroethene	5	ug/l	1 U	4 J	2 J	2 J
Vinyl Chloride	2	ug/l	1 U	<b>220</b>	<b>98</b>	<b>130</b>

Notes:

Bold font indicates value above screening level.

Qualifiers: U = non-detect; J or j = estimated; B = detected in method blank; see data validation memoranda for additional qualifier details.

GWW = groundwater sample; SW = surface water sample; DUP = duplicate sample; ug/l = micrograms per liter; mg/l = milligrams per liter

The screening levels are based on the following hierarchy for drinking water: 1) Federal MCL; 2) Regional Screening Levels Tap Water Ingestion (November 2013) value at the lower of the criteria calculated at either the target cancer risk of 1E-5 or target hazard quotient of 1. The perchlorate screening level is a USEPA Interim Health Advisory Level.



TABLE 8  
SUMMARY OF NDTSONERATION  
Atlantic Research Corporation, Gainesville, Virginia

Recirculation Rates

Dates	Extraction (DW-13) gpm	Injection IW-8 gpm	Comments
01/01/2012 to 04/15/2012	61-71	70-92	System operated under these conditions with the exception of non-operational times noted in the "Shutdown and O&M Activities" section below.
04/15/2012 to 09/04/2012	57-65	74-90	
09/04/2012 to 11/02/2012	48-65	76-84	
11/02/2012 to 01/02/2013	NA	NA	Missing information
01/02/2013 to 01/10/2013	52-60	93-98	System operated under these conditions with the exception of non-operational times noted in the "Shutdown and O&M Activities" section below.
01/10/2013 to 02/19/2013	NA	NA	Missing information
02/19/2013 to 02/28/2013	50-58	47-64	System operated under these conditions with the exception of non-operational times noted in the "Shutdown and O&M Activities" section below.
02/28/2013 to 10/10/2013	56-64	79-99	
10/11/2013 to 12/15/2013	0	0	Shutdown for troubleshooting and repairs
12/16/2013 to 12/23/2013	26-32	32-36	System operated under these conditions with the exception of non-operational times noted in the "Shutdown and O&M Activities" section below.

Lactate or EVO-Methanol Amendment

Dates	Concentration	Average Daily Injection (gal)	Comments
1/1/2012 - 5/1/2012	60% Sodium Lactate Solution	0-38	Lactate or EVO was injected during this period.
5/1/12 - 10/15/12	60% Sodium Lactate Solution and EVO	5-43	
10/15/12 - 12/31/13	EVO	0-14	

Shutdown and O&M Activities

Shutdown Date	Restart Date	Estimated Downtime (days)	Activity
01/09/12	01/11/12	2	Missing information - The system has typically been down as a result of issues such as: 1) earth fault on DW-13 extraction pump VFD; 2) sensor alarms associated with bag filter pressures or high EQ tank levels; 3) facility power outages; 4) pump motor overloads; and miscellaneous issues (see below and 2011 Update report for examples).
02/01/12	02/03/12	2	
02/16/12	02/16/12	<1	
02/22/12	02/22/12	<1	
03/01/12	03/01/12	<1	
03/19/12	03/19/12	<1	
03/21/12	03/23/12	2	
03/28/12	03/28/12	<1	
03/29/12	03/30/12	1	
04/02/12	04/02/12	<1	
04/08/12	04/09/12	1	
04/15/12	04/17/12	2	
05/12/12	05/14/12	<1	
05/29/12	05/30/12	1	
05/30/12	05/30/12	<1	
06/04/12	06/05/12	1	
06/11/12	06/11/12	<1	
06/13/12	06/14/12	1	
06/14/12	06/15/12	1	
06/16/12	06/18/12	2	Missing information - The system has typically been down as a result of issues such as: 1) earth fault on DW-13 extraction pump VFD; 2) sensor alarms associated with bag filter pressures or high EQ tank levels; 3) facility power outages; 4) pump motor overloads; and miscellaneous issues (see below and 2011 Update report for examples).
06/21/12	06/22/12	1	
06/23/12	06/25/12	2	
06/26/12	06/27/12	1	
06/27/12	06/28/12	1	
06/29/12	07/10/12	11	
07/19/12	07/19/12	<1	
07/27/12	07/27/12	<1	
07/29/12	07/30/12	1	
08/01/12	08/01/12	<1	
08/09/12	08/09/12	<1	
08/12/12	08/13/12	1	
08/14/12	08/15/12	1	
08/17/12	08/17/12	<1	
08/23/12	08/27/12	4	
09/04/12	09/05/12	1	
09/05/12	09/13/12	8	
09/13/12	09/14/12	1	
09/14/12	09/17/12	3	
09/17/12	09/24/12	7	
09/24/12	09/25/12	1	



TABLE 8  
SUMMARY OF NDTSONERATION  
Atlantic Research Corporation, Gainesville, Virginia

Shutdown Date	Restart Date	Estimated Downtime (days)	Activity
09/26/12	09/27/12	1	Missing information - The system has typically been down as a result of issues such as: 1) earth fault on DW-13 extraction pump VFD; 2) sensor alarms associated with bag filter pressures or high EQ tank levels; 3) facility power outages; 4) pump motor overloads; and miscellaneous issues (see below and 2011 Update report for examples).
09/27/12	09/28/12	1	
09/29/12	10/01/12	2	
10/02/12	10/02/12	<1	
10/02/12	10/03/12	1	
10/10/12	10/10/12	<1	
10/11/12	11/02/12	22	
11/02/12	01/02/13	61	Missing information
01/10/13	02/19/13	40	Missing information
03/06/13	03/07/13	1	System down due to blown fuses on power poles during snow storm. Repaired by power company.
03/07/13	03/13/13	6	System down due to transfer pump overload fault.
03/17/13	03/26/13	9	System down due to OLF fault on transfer pump VFD (motor overload), possibly due to high pressure on injection lines.
04/12/13	04/15/13	3	System down due to earth fault on DW-13 VFD.
04/28/13	04/29/13	1	System down due to earth fault on DW-13 VFD.
04/30/13	05/02/13	2	System down for cleaning IW-8 injection lines.
05/04/13	05/06/13	2	System down due to earth fault on DW-13 VFD.
05/23/13	05/23/13	<1	System down due to earth fault on DW-13 VFD.
05/27/13	05/28/13	1	System down due to earth fault on DW-13 VFD.
05/31/13	05/31/13	<1	System down due to earth fault on DW-13 VFD.
06/01/13	06/04/13	3	System down due to EQ tank level sensor alarm.
06/05/13	06/07/13	2	System down due to EQ tank level sensor alarm. Sensors were inspected, cleaned, and adjusted.
06/20/13	06/21/13	1	System down due to earth fault on DW-13 VFD.
07/05/13	07/09/13	4	System down due to earth fault on DW-13 VFD.
08/01/13	08/02/13	1	System down due to earth fault on DW-13 VFD.
08/12/13	08/13/13	1	System down due to earth fault on DW-13 VFD.
08/23/13	08/27/13	4	System down due to earth fault on DW-13 VFD.
09/05/13	09/10/13	5	System down due to earth fault on DW-13 VFD.
09/11/13	12/20/13	100	Shutdown for troubleshooting and repairs
12/23/13	12/31/13	8	Missing information

Acronyms:

gpd - gallons per day  
gph - gallons per hour  
gpm - gallons per minute  
hr - hour

Hz - hertz  
min - minutes  
O&M - operations and maintenance  
VFD - variable frequency drive



**TABLE 9**  
**2014-2015 NDTs PERFORMANCE MONITORING WELL SAMPLING PLAN**  
 Atlantic Research Corporation, Gainesville, Virginia

Aquifer	Well Function	Well ID	Sample Well	Well Sampling Frequency	Analytical Program and Sampling Frequency							
					VOCs	CIO4	1,3-DNB	Metals <sup>3</sup>	1,4-Dioxane	FPs <sup>1</sup>	Anions <sup>2</sup>	DHGs
Deep Groundwater	NDTS PMW	DW-13	✓	Semi-Annual	Semi-Annual	Semi-Annual	Biennial	Annual	Biennial	Semi-Annual	Annual	Annual
		DW-13 MID	✓	Semi-Annual	Semi-Annual							
		DW-22	✓	Annual	Annual	Annual	Biennial	Annual		Annual	Annual	Annual
		DW-28DD	✓	Annual	Annual	Annual		Annual		Annual	Annual	Annual
		DW-29D	✓	Annual	Annual	Annual		Annual		Annual	Annual	Annual
		DW-29I	✓	Annual	Annual	Annual	Biennial	Annual		Annual	Annual	Annual
		DW-35 Zone 5 <sup>4</sup>	✗									
		DW-35 Zone 8 <sup>4</sup>	✗									
		DW-36D	✓	Semi-Annual	Semi-Annual	Semi-Annual	Biennial	Annual		Semi-Annual	Annual	Annual
		DW-36DD	✓	Semi-Annual	Semi-Annual	Semi-Annual		Annual		Semi-Annual	Annual	Annual
		DW-72B	✓	Annual	Annual	Annual	Biennial	Annual	Biennial	Annual	Annual	Annual
		IW-8 <sup>5</sup>	✗									

**Notes**

<sup>1</sup> Field parameter sampling includes water levels, temperature, pH, ORP, DO, and conductivity.

<sup>2</sup> Anions sampling includes chloride, sulfate, and sulfide.

<sup>3</sup> Sample dissolved iron and manganese only.

<sup>4</sup> This well is very close to IW-8 and is no longer needed to demonstrate the hydraulic connection. Cluster DW-36 will be used as a substitute.

<sup>5</sup> This is the injection well. It cannot be easily sampled, instead DW-13 MID is used as a surrogate.

**Sampling Frequency**

Quarterly - four times a year

Semi-Annual - twice a year

Annual - once a year

Biennial - once every two years

✓ sample well in future

✗ do not sample well in future

**Acronyms**

1,3-DNB - 1,3-dinitrobenzene

% - percent

CIO4 - perchlorate

DHGs - dissolved hydrocarbon gasses

DO - dissolved oxygen

FPs - field parameters

**Acronyms**

ID - identification

NDTS - northern deep groundwater treatment system

ORP - oxidation reduction potential

PMW - performance monitoring well

VOCs - volatile organic compounds



**TABLE 10**  
**2014-2015 GROUNDWATER SAMPLING PLAN**  
 Atlantic Research Corporation, Gainesville, Virginia

Aquifer	Well Function	Well ID	Sampling Rationale	Sample Well	Analytical Program and Sampling Frequency							
					VOCs	CIO4	RDX	PCBs	Manganese	Cobalt	1,4-Dioxane <sup>1</sup>	FPs <sup>2</sup>
Deep Groundwater	Boundary Compliance <sup>3</sup>	DW 200-01	Property Boundary. All COCs Below SL	✓	Semi-Annual	Semi-Annual						Yes
		DW SB-01	Property Boundary. Mn >SL and stable. Other COCs Below SL	✓	Semi-Annual	Semi-Annual			Annual		Annual	Yes
		DW SB-02	Property Boundary. 111DCE >SL and stable. Other COCs Below SL	✓	Semi-Annual	Semi-Annual					Annual	Yes
		DW-12	Property Boundary. 111DCE >SL and stable. Other COCs Below SL	✓	Semi-Annual	Semi-Annual					Annual	Yes
		DW-17	Property Boundary. Not downgradient of plumes, SB-01 is further downgradient.	✗								-
	Plume Monitoring	BW 78-11D	VOCs ND (>3yr), CIO4 Stable since 2010, Periphery of NDTs source area	✓		Biennial						Yes
		BW 78-12D	VOCs ND (3 yr) or < SLs (3yr), CIO4 No Trend, Near NDTs source area wells DW-29	✓		Biennial						Yes
		BW 90-01	VOCs ND (3 yr), CIO4 Decreasing (3yr < SLs), Mn Decreasing (2yr < SL)	✓					Biennial			Yes
		BW CM-03	Redundant with DW CM-01. VOCs ND (3 yr), CIO4 Stable	✗								-
		BW NE-01D	VOCs ND(3 yr), CIO4 Decreasing (3yr < SLs)	✗								-
		DW 106-01	VOCs ND (3 yr), CIO4 and Mn < SLs (3yr)	✗								-
		DW 213-01	VOCs ND (3 yr), CIO4 > SL and Stable, Mn Stable (3yr < SLs)	✓		Annual						Yes
		DW 52-01	VOCs ND (3 yr), CIO4 < SLs (3yr), Mn Stable (3yr < SLs)	✗								-
		DW 68-01	VOCs ND or <SLs (3yr), CIO4 ND (3 yr), Mn Stable (3yr < SLs)	✗								-
		DW 76-01	VC (3yr < SL), 1,1-DCE Stable, CIO4 Stable, Mn Stable (3yr < SLs), 1,4-Dioxane Inc/Stable	✓	Annual	Annual					Annual	Yes
		DW 85-01	VOCs ND or <SLs (>3yr), CIO4 Decr. (1yr<SL), RDX (3yr < SLs), Mn Stable (3yr < SL)	✓		Annual						Yes
		DW CM-01	Redundant with BW CM-03. VOCs ND (3 yr), CIO4 Stable, Mn Stable (3yr < SLs)	✓		Annual						Yes
		DW-10	Eastern Portion of Site. VOCs ND (5yr), CIO4 Stable (5yr < SLs)	✗								-
		DW-14	VOCs ND or <SLs (>3yr), CIO4 < SLs (>3yr)	✗								-
		DW-15	11DCE Decr (>SL), VC Incr/Stable (>SL), CIO4 Decr. (6yr < SLs), RDX Stable (3yr < SLs)	✓	Annual							Yes
		DW-16	VC (2yr < SL), 1,1-DCE Decr. (>SL), CIO4 Decr. (2yr<SL), RDX Decr (3yr < SL).	✓	Annual	Annual						Yes
		DW-18	PCE, TCE, 1,1-DCE No Trend, CIO4 No Trend	✓	Annual	Annual					Annual	Yes
		DW-2	VOCs ND or (4yr < SLs), CIO4 Decreasing (5yr < SLs)	✗								-
		DW-20	1,1-DCE Stable, CIO4 No Trend (4yr < SLs). Central Location on Property	✓	Annual							Yes
		DW-23	1,1-DCE Stable, CIO4 Stable, RDX Stable (4yr < SLs), 14-dioxane (1yr>SL)	✓	Annual	Annual					Annual	Yes
		DW-24	11DCE, PCE, VC Stable/Incr, CIO4 No Trend, 14-dioxane (4yr<SL)	✓	Annual	Annual						Yes
		DW-25	VC Stable/Incr, 1,1-DCE No Trend (2yr < SL), CIO4 Decreasing (2Yr < SL)	✓	Annual	Annual						Yes
		DW-26D	PCE, VC, 1,1-DCE No Trend, CIO4 < SLs (3yr)	✓	Annual							Yes
		DW-26I	11-DCE decreasing, PCE, VC Stable, CIO4 Decreasing, 14-dioxane (3yr < SL or ND)	✓	Annual	Annual						Yes
		DW-26S	VOCs ND or < SLs (3 yr), CIO4 Stable < SLs (5yr)	✗								-
		DW-28D	11DCE, PCE Decreasing, VC No Trend, CIO4 Decreasing	✓	Annual	Annual						Yes
		DW-28I	111TCA, 11DCE, PCE No Trend, CIO4 No Trend, 1,4-Dioxane Below SL	✓	Annual	Annual					Annual	Yes
		DW-28S	11-DCE Decreasing, CIO4 Decreasing/No Trend 1,4-Dioxane (2yr > SL)	✓	Annual	Annual					Annual	Yes
		DW-29S	VOCs ND or <SLs (3yr), CIO4 No Trend, 14-dioxane (3yr < SL or ND)	✓		Annual						Yes
		DW-3	VC, TCE No Trend, CIO4 <SLs (5 yr)	✓	Annual							Yes
		DW-30D	1,1-DCE Decreasing, CIO4 Decreasing, 14-dioxane (1 yr > SL)	✓	Annual	Annual					Annual	Yes
		DW-30I	VC No Trend, 1,1-DCE Stable, CIO4 No Trend (7yr < SLs)	✓	Annual						Annual	Yes
		DW-30S	1,1-DCE Decreasing, CIO4 Decreasing	✓	Annual	Annual						Yes
		DW-31D	1,1-DCE Stable (3 of last 4 samples < SL), CIO4 ND (4 yr)	✓	Annual							Yes
		DW-32I	Near soil remedy area. PCE, TCE, VC, 11-DCE, 11DCA Stable, CIO4 Decreasing (5yr < SLs), 1,4-Dioxane No Trend	✓	Annual						Annual	Yes



**TABLE 10**  
**2014-2015 GROUNDWATER SAMPLING PLAN**  
 Atlantic Research Corporation, Gainesville, Virginia

Aquifer	Well Function	Well ID	Sampling Rationale	Sample Well	Analytical Program and Sampling Frequency							
					VOCs	CIO4	RDX	PCBs	Manganese	Cobalt	1,4-Dioxane <sup>1</sup>	FPs <sup>2</sup>
Deep Groundwater	Plume Monitoring	DW-34	VOCs ND or <SL, CIO4 No Trend (3yr < SLs), Mn 3 of last 4 events < SL, Near DW-20	✖								-
		DW-35 Zone 1	Redundant to NDTS monitoring	✖								-
		DW-35 Zone 2	Redundant to NDTS monitoring	✖								-
		DW-35 Zone 3	Redundant to NDTS monitoring	✖								-
		DW-35 Zone 4	Redundant to NDTS monitoring	✖								-
		DW-35 Zone 6	Redundant to NDTS monitoring	✖								-
		DW-35 Zone 7	Redundant to NDTS monitoring	✖								-
		DW-5	Upgradient, VOCs (3yr < SLs), CIO4 Stable (3yr < SLs)	✖								-
		DW-6	VOCs ND or <SL(3 yr), CIO4 ND or < SL (3yr)	✖								-
		DW-72A	PCE stable to no trend, 11-DCE Decreasing, CIO4 No Trend	✓	Annual	Annual						Yes
Shallow Groundwater	Boundary Compliance <sup>3</sup>	IW-3	Redundant with DW-16. Between NDTS and Boundary. 11DCE and VC increase in 2013.	✖								-
		IW-6	Source area. PCE, TCE, VC, 1,1-DCE stable, CIO4 likely decreasing	✓	Annual	Annual						Yes
		SW 200-02	VOCs and CIO4 Sampled Annually at Site Boundary, All COCS < SL	✓	Annual	Annual						Yes
		SW 212-01	VOCs and CIO4 Sampled Annually at Site Boundary	✓	Annual	Annual						Yes
		SW 222-02	VOCs and CIO4 Sampled Annually at Site Boundary, All COCS < SL	✓	Annual	Annual						Yes
		SW PBS-01	VOCs and CIO4 Sampled Annually, 1,4-Dioxane Below SL	✓	Annual	Annual						Yes
		SW SB-01	VOCs and CIO4 Sampled Annually at Site Boundary, Mn Stable, Co Stable < SLs	✓	Annual	Annual			Annual			Yes
		SW SB-02	VOCs and CIO4 Sampled Annually at Site Boundary; Co and Mn Stable < SLs (3yr), 1,4-Dioxane Below SL	✓	Annual	Annual						Yes
		SW SB-03	VOCs and CIO4 Sampled Annually at Site Boundary; Co No Trend, Mn Stable < SLs (3yr), 1,4-Dioxane Below SL	✓	Annual	Annual						Yes
	Plume Monitoring	BW 100-02S	PCE, TCE, VC, 1,1-DCE ND (<3yr), CIO4 Stable (4yr < SLs)	✖								-
		BW 116-01	Redundant with BW 119-01 with similar results. VOCs (ND 3yr), CIO4 Decreasing, RDX Decreasing, Mn Stable (4yr < SLs)	✖								-
		BW 119-01	VOCs No Trend (3yr < SLs), CIO4 No Trend, RDX Stable, Mn Stable (3yr < SLs)	✓		Annual	Annual					Yes
		BW 14-02S	PCE, TCE, 1,1-DCE Stable, CIO4 Stable	✓	Annual	Annual						Yes
		BW 16-04D	PCE, TCE, 11DCE, CIO4 Stable (>SL)	✓	Annual	Annual						Yes
		BW 200-01	VOCs ND or <SLs (3yr), CIO4 ND (3yr), Mn Decreasing	✓					Annual			Yes
		BW 21-04D	VOCs ND or <SLs (3yr), CIO4 Decreasing	✓		Annual						Yes
		BW 212-01	R&D area. Also considered a property boundary monitoring locations. TCE Decreasing (1yr <SL), 1,1-DCE Decreasing, CIO4 ND (3yr), Mn Stable (3yr < SLs)	✓	Annual							Yes
		BW 217-01	VOCs ND (3 yr), CIO4 Decreasing (3yr < SLs), Mn Stable (3yr < SLs)	✖								-
		BW 225-01	TCE (4yr < SL), 1,1-DCE Decr (1 yr < SL), CIO4 Stable, Mn (3yr < SL)	✓	Annual	Annual						Yes
		BW 237-01D	VOCs ND (4 yr), CIO4 Decreasing (4yr <SL)	✖								-
		BW 28-02S	PCE, TCE, 11DCE, CIO4 Stable, 1,4-Dioxane Decreasing	✓	Annual	Annual					Annual	Yes
		BW 28-04D	PCE, TCE, 1,1-DCE Stable, CIO4 Stable	✓	Annual	Annual						Yes
		BW 31-01S	PCE, TCE No Trend, CIO4 No Trend	✓	Annual	Annual						Yes
		BW 34-01	PCE Stable, CIO4 Stable-Decreasing, Mn Stable (3yr < SL)	✓	Annual	Annual						Yes
		BW 40-04	Redundant with other nearby building 40 wells. PCE, TCE No Trend (1yr < SL), CIO4 (3yr < SLs), Mn (3yr < SL)	✖								-
		BW 45-03S	PCE, TCE, VC Stable. CIO4 No Trend (3yr <SL), Mn No Trend (1yr > SL)	✓	Annual	Annual			Annual			Yes
		BW 46-02	VOCs ND or <SLs (3yr), CIO4 ND (3yr), Mn Stable (3yr < SLs)	✖								-



**TABLE 10**  
**2014-2015 GROUNDWATER SAMPLING PLAN**  
 Atlantic Research Corporation, Gainesville, Virginia

Aquifer	Well Function	Well ID	Sampling Rationale	Sample Well	Analytical Program and Sampling Frequency							
					VOCs	CIO4	RDX	PCBs	Manganese	Cobalt	1,4-Dioxane <sup>1</sup>	FPs <sup>2</sup>
Shallow Groundwater	Plume Monitoring	BW 5-05S	Redundant with SW 5-04 based on distance and COCs. PCE, TCE, CIO4 Stable, 111TCA Decreasing, 1,4-Dioxane Below SL	✖								-
		BW 5-06D	PCE Increasing, TCE Stable, CIO4 Stable	✓	Annual	Annual						Yes
		BW 68-01	VOCs ND (3 yr), CIO4 No Trend (3yr < SLs), Mn Stable (3yr < SLs)	✖								-
		BW 73-01S	VOCs ND (3yr), CIO4 Decreasing (3yr < SLs)	✖								-
		BW 79-02S	111-TCA, 11-DCE Increasing, CIO4 Decreasing, 1,4-Dioxane Below SL	✓	Annual	Annual					Annual	Yes
		BW 86-01	VOCs ND or <SLs (3yr), CIO4 < SLs (3yr), Co, Mn Stable (3yr < SLs)	✖								-
		BW 93-01	VOCs ND (3yr), CIO4 Decreasing (3yr < SLs), Mn Stable (3yr < SLs)	✖								-
		BW CG-01D	PCE, 1,1-DCE Stable or Decr., CIO4 Decreasing, RDX Stable 1,4-Dioxane No Trend	✓	Annual	Annual	Annual				Annual	Yes
		BW CM-01S	PCE, 1,1-DCE and CIO4 decreasing, RDX Stable or decreasing	✓	Annual	Annual						Yes
		BW NE-01S	VOCs ND (<3yr), CIO4 No Trend < SLs (4 events)	✖								-
		BW TTU-03D	PCE, VC Stable, CIO4 No Trend, Co, Mn Stable	✓	Annual	Annual			Annual	Annual		Yes
		DW-31I	VOCs ND or <SLs (3yr), CIO4 ND (3 yr)	✖								-
		SW 105-01	PCE Stable, CIO4 No Trend, RDX Stable	✓	Annual	Annual						Yes
		SW 105-03D	PCE, 1,1-DCE Stable, CIO4 Stable	✓	Annual	Annual						Yes
		SW 115-01S	VOCs ND (3yr), CIO4 Stable	✓		Annual						Yes
		SW 15-02	PCE, TCE, 1,1-DCE, CIO4 Stable, 1,4-Dioxane No Trend, VOCs sl. rising trend last 2 events	✓	Annual	Annual					Annual	Yes
		SW 152-01	VOCs ND (3 yr), CIO4 No Trend (3yr < SLs)	✖								-
		SW 204-01	TCE Stable, CIO4 Stable (3yr < SLs), Mn Stable (3yr < SL)	✖								-
		SW 28-41	Redundant with nearby SW 47-02, PCE, CIO4 No Trend, RDX Stable (3yr < SLs), Mn Stable	✓	Annual	Annual						Yes
		SW 35-01S	2004 only detections > SL. VOC and CIO4 < SL or ND last 3 events.	✖								-
		SW 40-06	Lowest concentrations and redundant with other nearby building 40 wells. PCE Decreasing (2yr < SL), CIO4 Decreasing (3yr < SLs)	✖								-
		SW 40-07A	PCE, TCE, VC, 1,2-DCE Stable or No Trend, CIO4 Stable	✓	Annual	Annual						Yes
		SW 40-51	TCE, PCE, 11DCE Stable (4yr < SL), CIO4 Decreasing (3yr < SLs), PCBs Stable (1yr < SL)	✖								-
		SW 40-57	PCE, TCE, 1,2-DCE, VC Stable, CIO4 Stable	✓	Annual	Annual						Yes
		SW 42-02	11DCE, PCE Stable (3yr < SL), CIO4 Decreasing	✓		Annual						Yes
		SW 46-01	PCE, TCE Stable, CIO4 Decreasing, Long-Term Data	✓	Annual	Annual						Yes
		SW 47-02	TCE Stable, PCE Stable or Decreasing, CIO4 Decreasing	✓	Annual	Annual						Yes
		SW 47-05	VOCs 3yr < SLs, CIO4 ND (3yr). Close to boundary wells.	✖								-
		SW 5-04	VOCs Stable, CIO4 Stable, PCBs Stable, Mn Stable, 1,4-Dioxane (5 events < SL)	✓	Annual	Annual		Annual				Yes
		SW 70-01	Not needed given low CIO4 and other nearby wells. PCE, TCE, VC, 1,1-DCE ND (<3yr), CIO4 Decreasing	✖								-
		SW 74-02	Redundant with SW 74-07. PCE, TCE No Trend, CIO4 No Trend, RDX Decreasing	✖								-
		SW 74-06	Redundant with SW 74-07. PCE, TCE Stable, CIO4 Stable, RDX Stable (3yr < SLs)	✖								-
		SW 74-07	PCE Stable, VC No Trend, CIO4 No Trend, RDX Stable	✓	Annual	Annual	Annual					Yes
		SW CM-05	VOCs ND (<3yr), CIO4 (3yr < SLs), Co, Mn Stable	✖								-
	TTU MW <sup>4,5</sup>	BW TTU-02D <sup>5</sup>	Abandoned 3/28/2012. VOCs, CIO4, and RDX per TTU sampling plan, PCE and CIO4 Stable, RDX (3yr < SLs), Mn (3yr < SLs), PCBs No Trend	✖								
		BW TTU-02S <sup>5</sup>	Abandoned 3/28/2012. VOCs, CIO4, and RDX per TTU sampling plan, VOCs and CIO4 ND or <SLs (3yr), RDX ND (<3yr)	✖								
		BW TTU-05	VOCs, CIO4, and RDX per TTU sampling plan, VOCs ND or <SLs (3yr), CIO4 Stable, RDX No Trend (3yr < SLs)	✓	Semi-Annual	Semi-Annual	Semi-Annual		Annual			Yes
		SW TTU-03	VOCs, CIO4, and RDX per TTU sampling plan, VOCs ND (3yr), CIO4 Stable, RDX Stable (3yr < SLs)	✓	Semi-Annual	Semi-Annual	Semi-Annual					Yes
		SW TTU-05	VOCs, CIO4, and RDX per TTU sampling plan, PCE, TCE, 1,1-DCE Stable, CIO4 Stable (3yr < SLs), RDX ND (3yr), Mn Decreasing, Co Stable	✓	Semi-Annual	Semi-Annual	Semi-Annual		Annual	Annual		Yes



**TABLE 10**  
**2014-2015 GROUNDWATER SAMPLING PLAN**  
 Atlantic Research Corporation, Gainesville, Virginia

Aquifer	Well Function	Well ID	Sampling Rationale	Sample Well	Analytical Program and Sampling Frequency							
					VOCs	CIO4	RDX	PCBs	Manganese	Cobalt	1,4-Dioxane <sup>1</sup>	FPs <sup>2</sup>
Surface Water	Boundary	STR 02	VOCs and CIO4 Sampled Annually at Site Boundary, dependent on stream flow	✓	Annual	Annual						Yes
	Compliance <sup>3</sup>	STR 04	VOCs and CIO4 Sampled Annually at Site Boundary	✓	Annual	Annual						Yes
	Surface Water Monitoring	STR 06	Sample at STR 04 as alternate.	✗								-
		STRA 07	Sample at STR 04 as alternate.	✗								-
		STR 40-15	PCE, TCE, VC No Trend, CIO4 Decreasing (3yr < SLs)	✓	Annual	Annual						Yes
		STR 40-25	VOCs No Trend, CIO4 No Trend (3yr < SLs)	✗								-
		STR 40-27	VOCs ND (3yr), CIO4 ND (3yr), Other surface water samples at STR 40-15 and STR 04	✗								-
		West 01	VOCs ND (3 yr), CIO4 Stable or Increasing, RDX Stable (3yr < SLs)	✓		Annual						Yes
		East 01	No VOCs in groundwater or soil in proximity, CIO4 Stable < SLs (3yr)	✗								-

**Notes**

<sup>1</sup> Wells to be sampled for 1,4-dioxane were above the screening level.

<sup>2</sup> Field parameter will be collected each time a well is sampled. Field parameters include temperature, pH, ORP, DO, conductivity, and water levels.

<sup>3</sup> To ensure boundary compliance, locations at the site boundary are sampled for VOCs and perchlorate at minimum annually. Secondary COCs that are less than three calendar years below screening level are sampled annually.

<sup>4</sup> Wells will be sampled semi-annually for VOCs, perchlorate, and RDX in accordance with the approved TTF Closure Amendment document (dated April 2010).

<sup>5</sup> Well abandoned as part of Interim Measures for soil during 2012-2013.

**Sampling Frequency**

Quarterly - four times a year

Semi-Annual - twice a year

Annual - once a year

Biennial - once every two years

✓ sample well in future

✗ do not sample well in future

**Acronyms**

1,1-DCE - 1,1-dichloroethene

CIO4 - perchlorate

Co - cobalt

COCs - constituents of concern

DO - dissolved oxygen

FPs - field parameters

ID - identification

IMs - Interim Measures

Mn - manganese

MW - monitoring well

ND - non-detect

NDTS - northern deep groundwater treatment system

ORP - oxidation reduction potential

PCBs - polychlorinated biphenyls

PCE - tetrachloroethene

RDX - hexahydro-1,3,5-trinitro-1,3,5-triazine

SLs - screening levels

SRA - soil removal area

TCE - trichloroethene

TTF - Thermal Treatment Facility

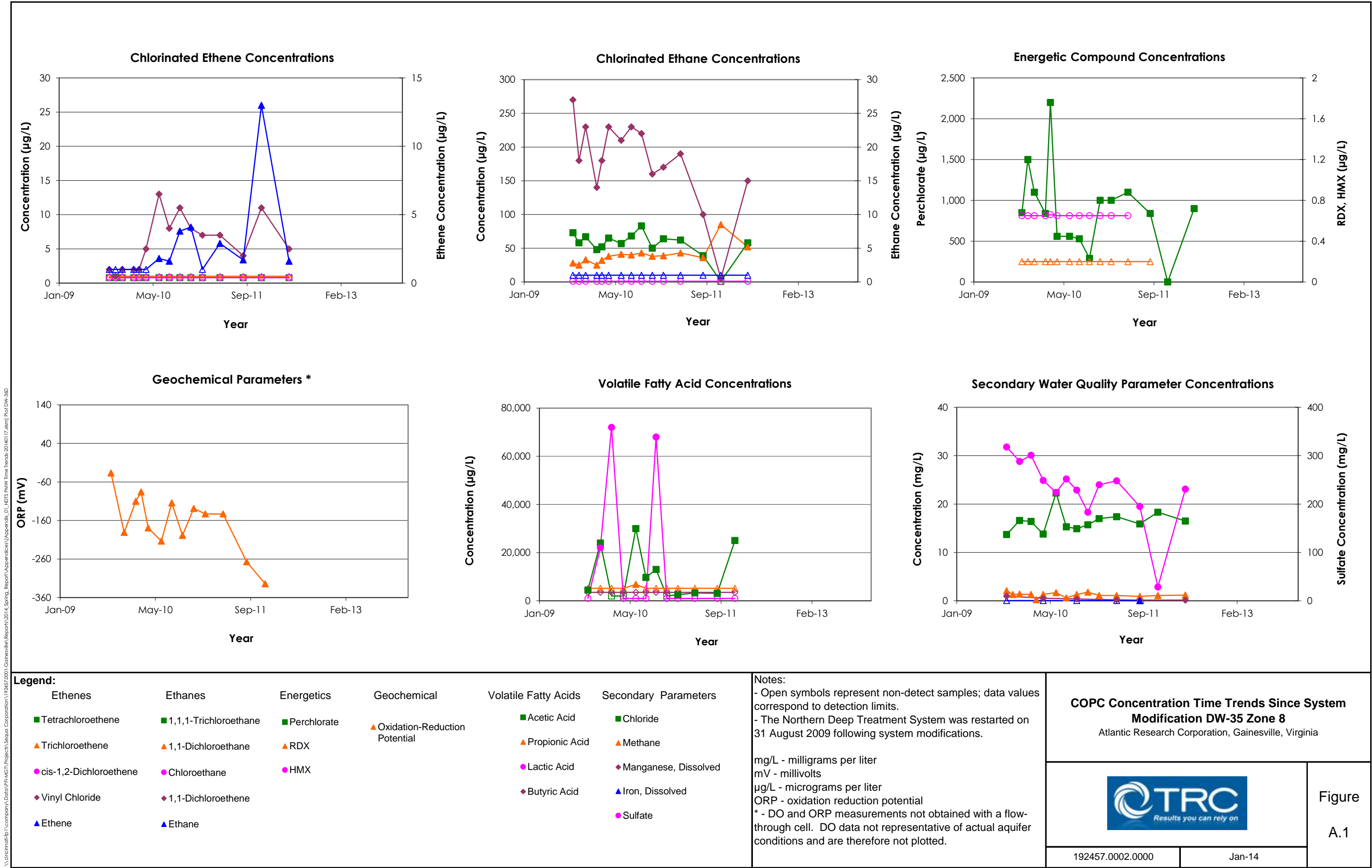
VC - vinyl chloride

VOCs - volatile organic compounds

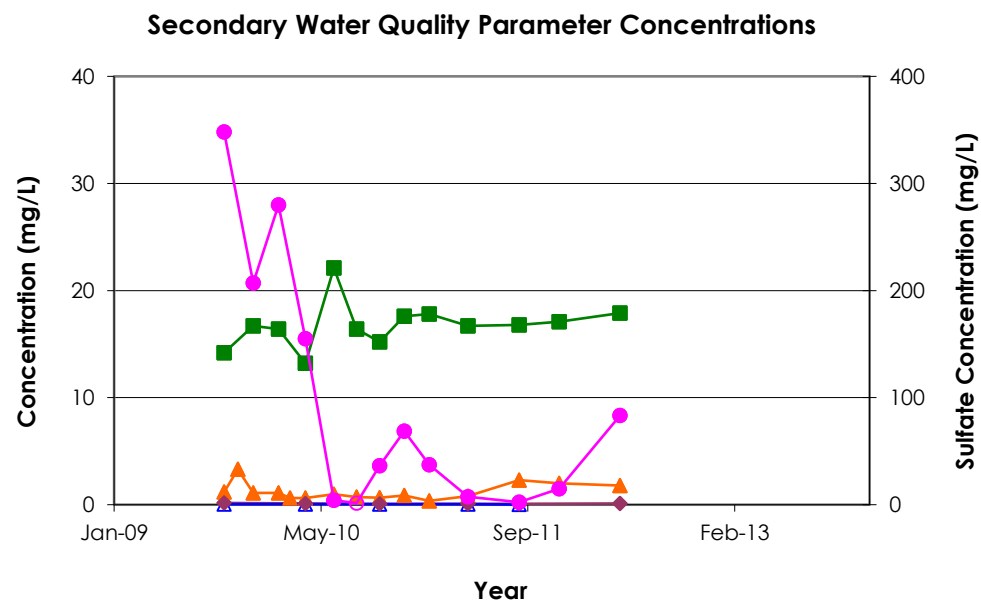
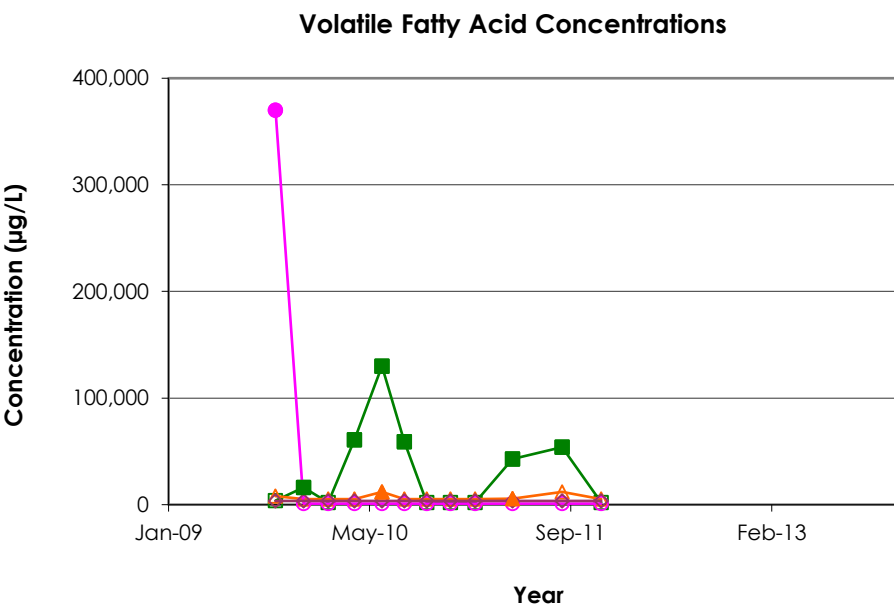
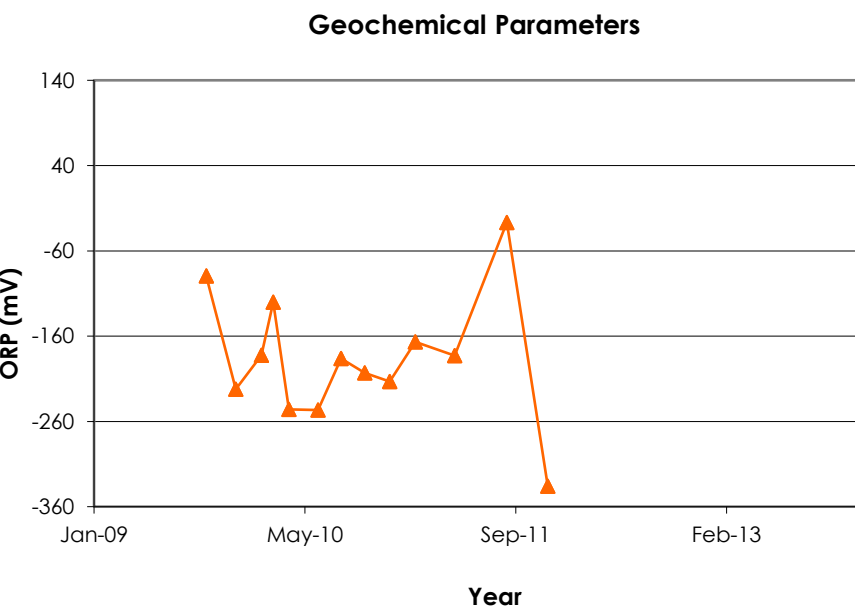
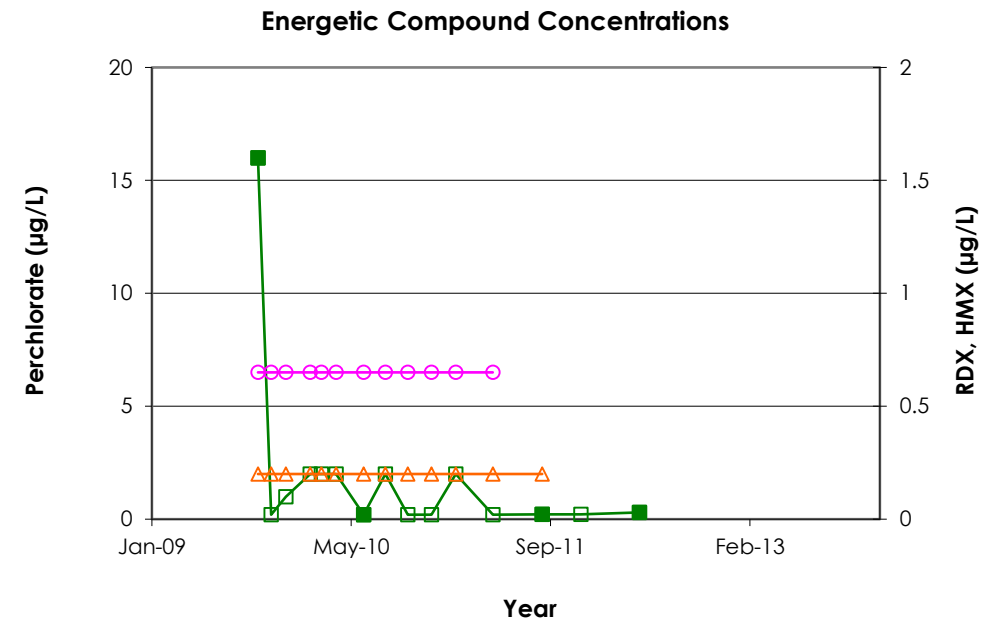
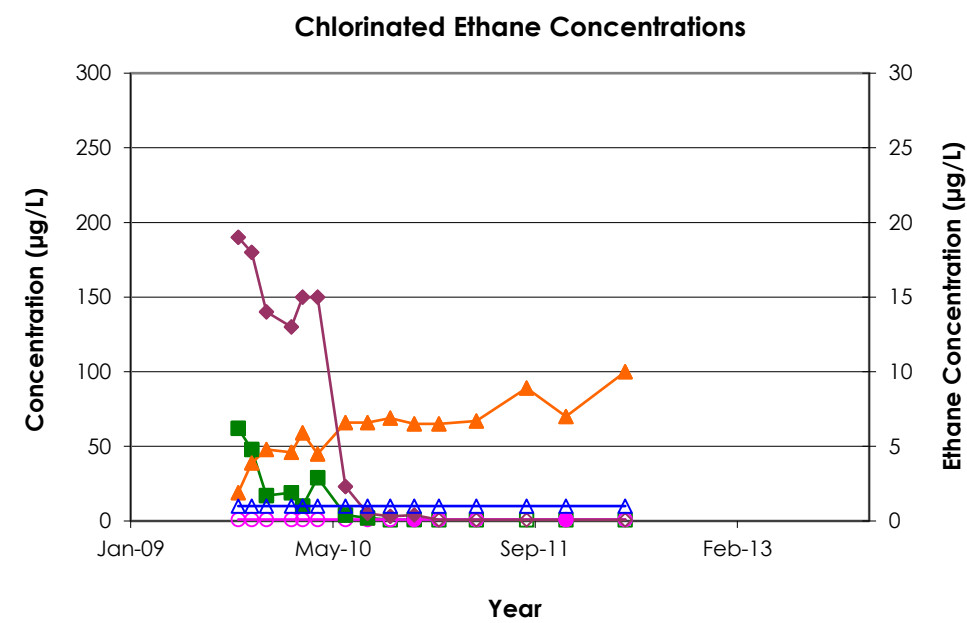
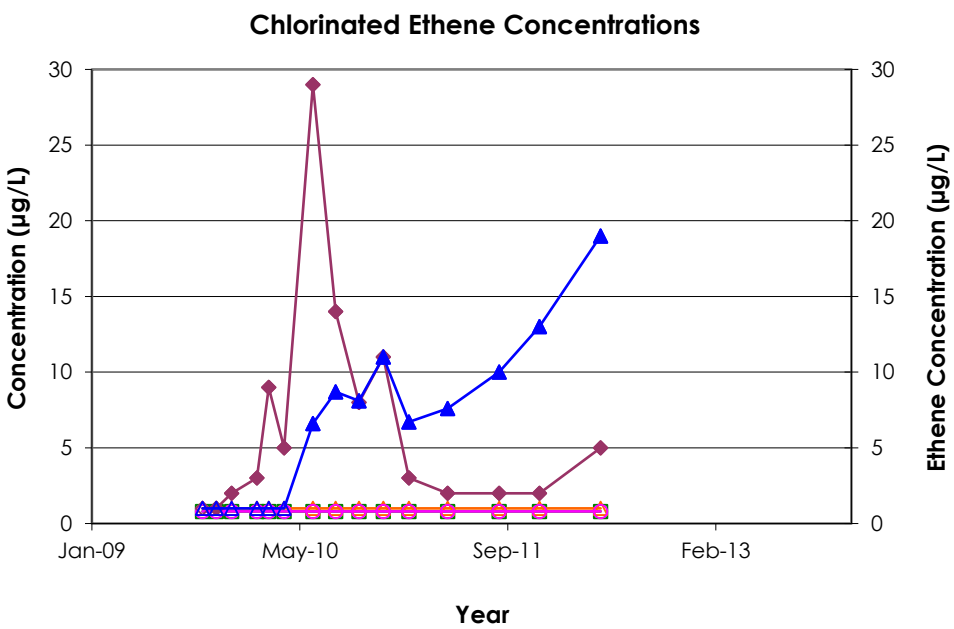
yr - year

## **APPENDIX A**

### **NDTS PERFORMANCE MONITORING WELL TIME TREND CHARTS**



\\Grcinm1Hp\Company\Data\PH-MGT\Projects\Seque Corporation\192457\0001-Gainesville\Reports\2014\_Spring\_Report\_Appendices\Appendix\_C\LDIS PMW Time Trends-20140117.xlsm Plot DW-36D



**Legend:**

Ethenes	Ethanes	Energetics	Geochemical	Volatile Fatty Acids	Secondary Parameters
■ Tetrachloroethene	■ 1,1,1-Trichloroethane	■ Perchlorate	▲ Oxidation-Reduction Potential	■ Acetic Acid	■ Chloride
▲ Trichloroethene	▲ 1,1-Dichloroethane	▲ RDX		▲ Propionic Acid	▲ Methane
● cis-1,2-Dichloroethene	● Chloroethane	● HMX		● Lactic Acid	◆ Manganese, Dissolved
◆ Vinyl Chloride	◆ 1,1-Dichloroethene			◆ Butyric Acid	▲ Iron, Dissolved
▲ Ethene	▲ Ethane				● Sulfate

**Notes:**

- Open symbols represent non-detect samples; data values correspond to detection limits.  
- The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.

mg/L - milligrams per liter  
mV - millivolts  
µg/L - micrograms per liter  
ORP - oxidation reduction potential  
\* - DO and ORP measurements not obtained with a flow-through cell. DO data not representative of actual aquifer conditions and are therefore not plotted.

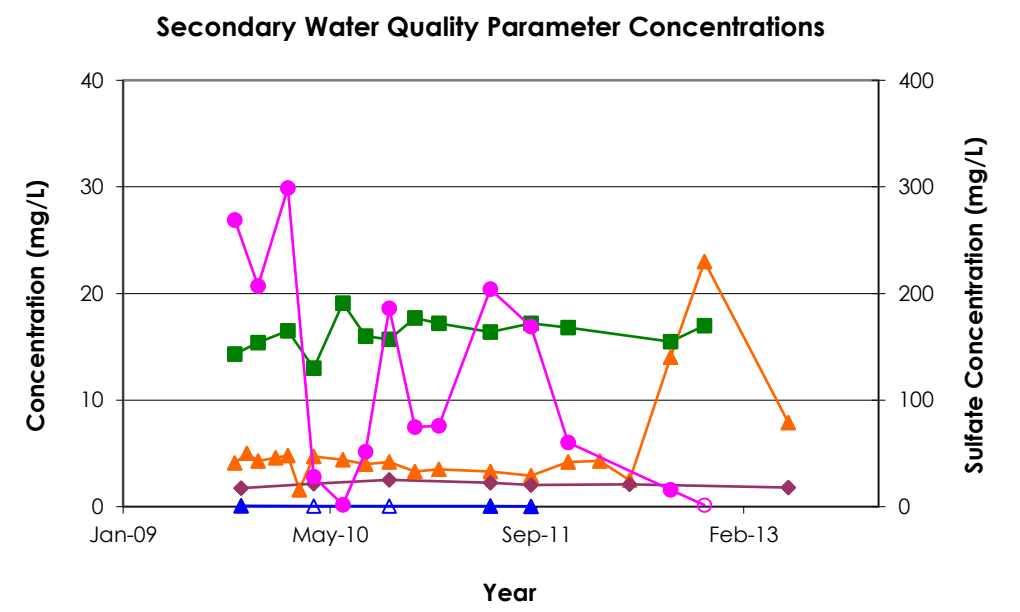
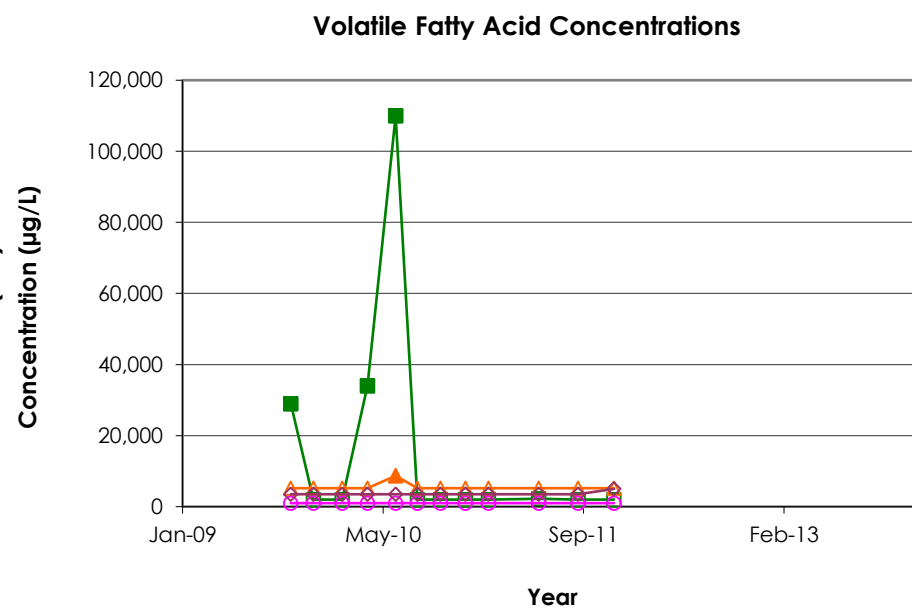
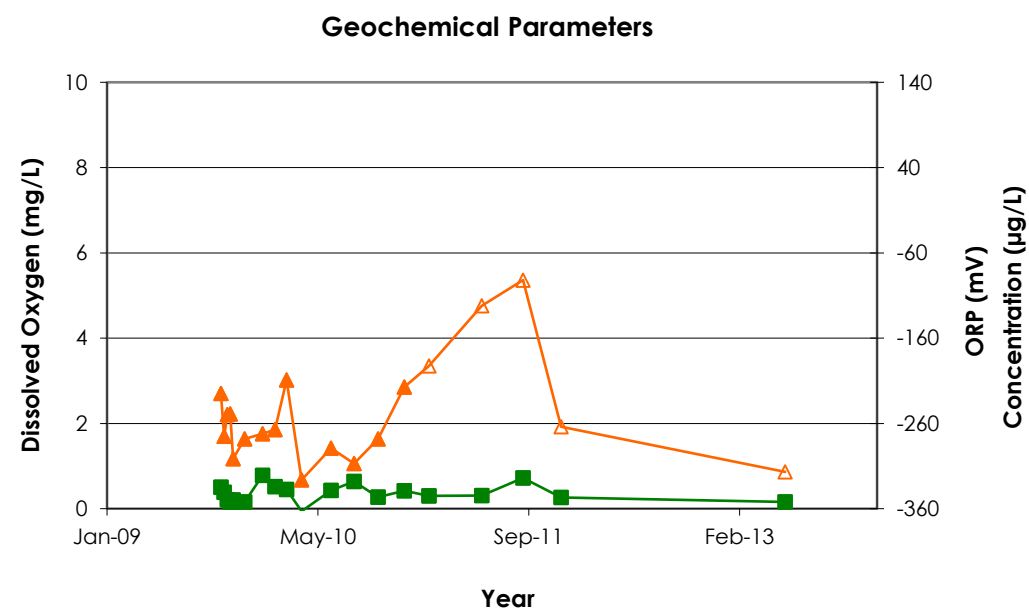
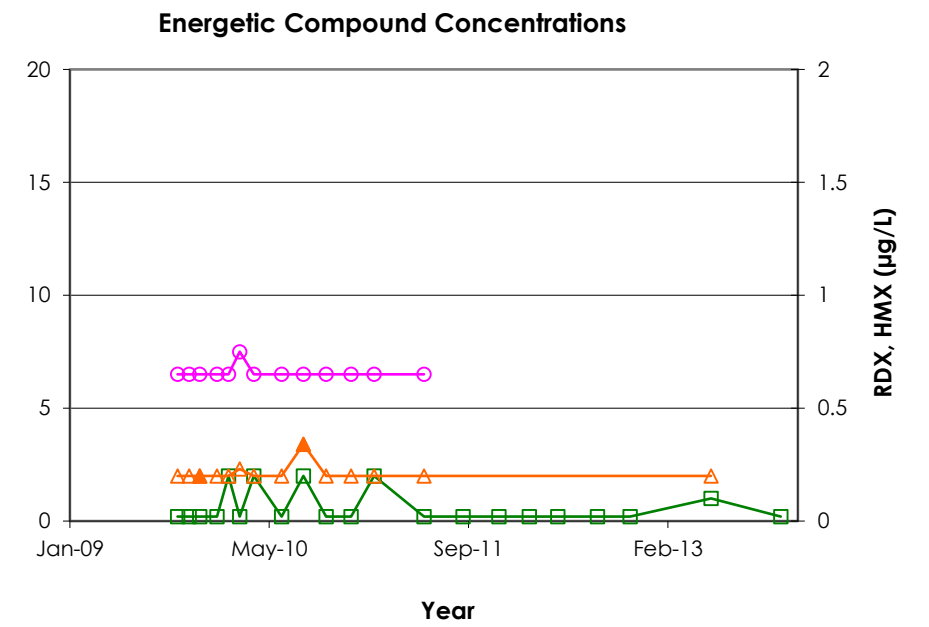
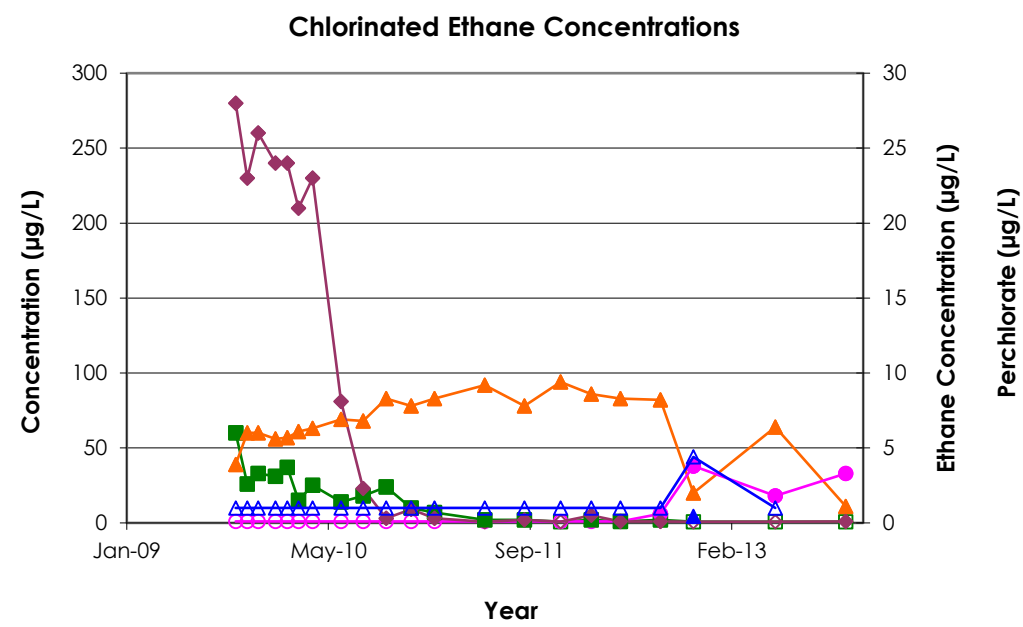
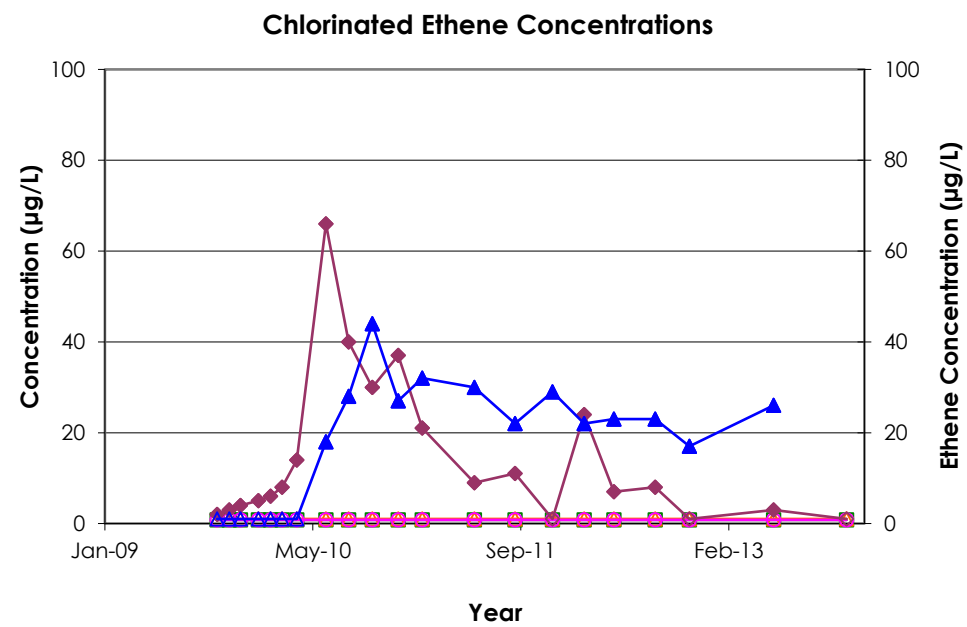
**COPC Concentration Time Trends Since System Modification DW-35 Zone 5**  
Atlantic Research Corporation, Gainesville, Virginia



Figure  
A.2

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**Legend:**

Ethenes	Ethanes	Energetics	Geochemical	Volatile Fatty Acids	Secondary Parameters
■ Tetrachloroethene	■ 1,1,1-Trichloroethane	■ Perchlorate	■ Dissolved Oxygen	■ Acetic Acid	■ Chloride
▲ Trichloroethene	▲ 1,1-Dichloroethane	● HMX	▲ Oxidation-Reduction Potential	▲ Propionic Acid	▲ Methane
● cis-1,2-Dichloroethene	● Chloroethane	▲ RDX		● Lactic Acid	◆ Manganese, Dissolved
◆ Vinyl Chloride	◆ 1,1-Dichloroethene			◆ Butyric Acid	▲ Iron, Dissolved
▲ Ethene	▲ Ethane				● Sulfate

Notes: - Open symbols represent non-detect samples; data values correspond to detection limits. - The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.
--

mg/L - milligrams per liter  
mV - millivolts  
µg/L - micrograms per liter  
ORP - oxidation reduction potential

## COPC Concentration Time Trends Since System Modification DW-36D

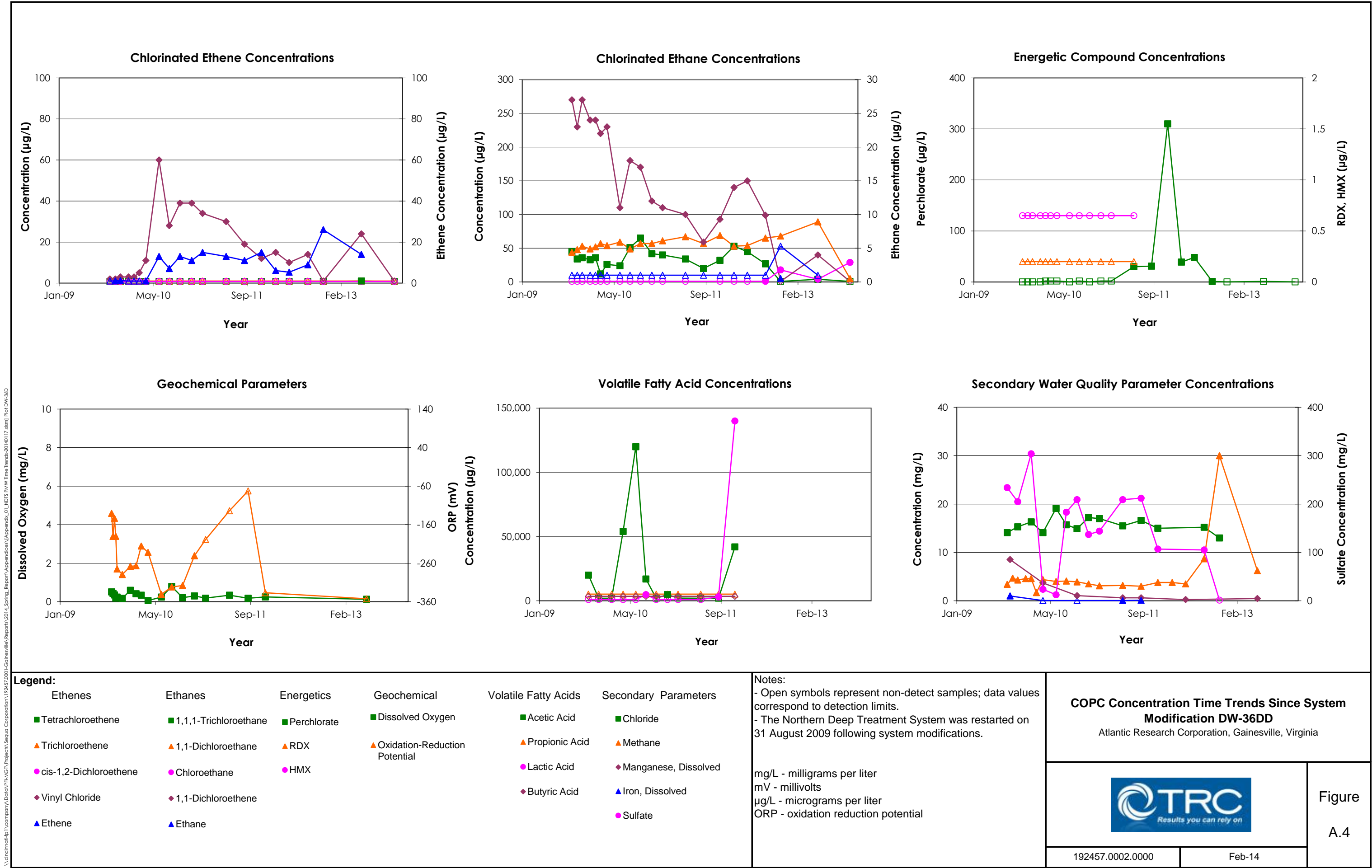
Atlantic Research Corporation, Gainesville, Virginia

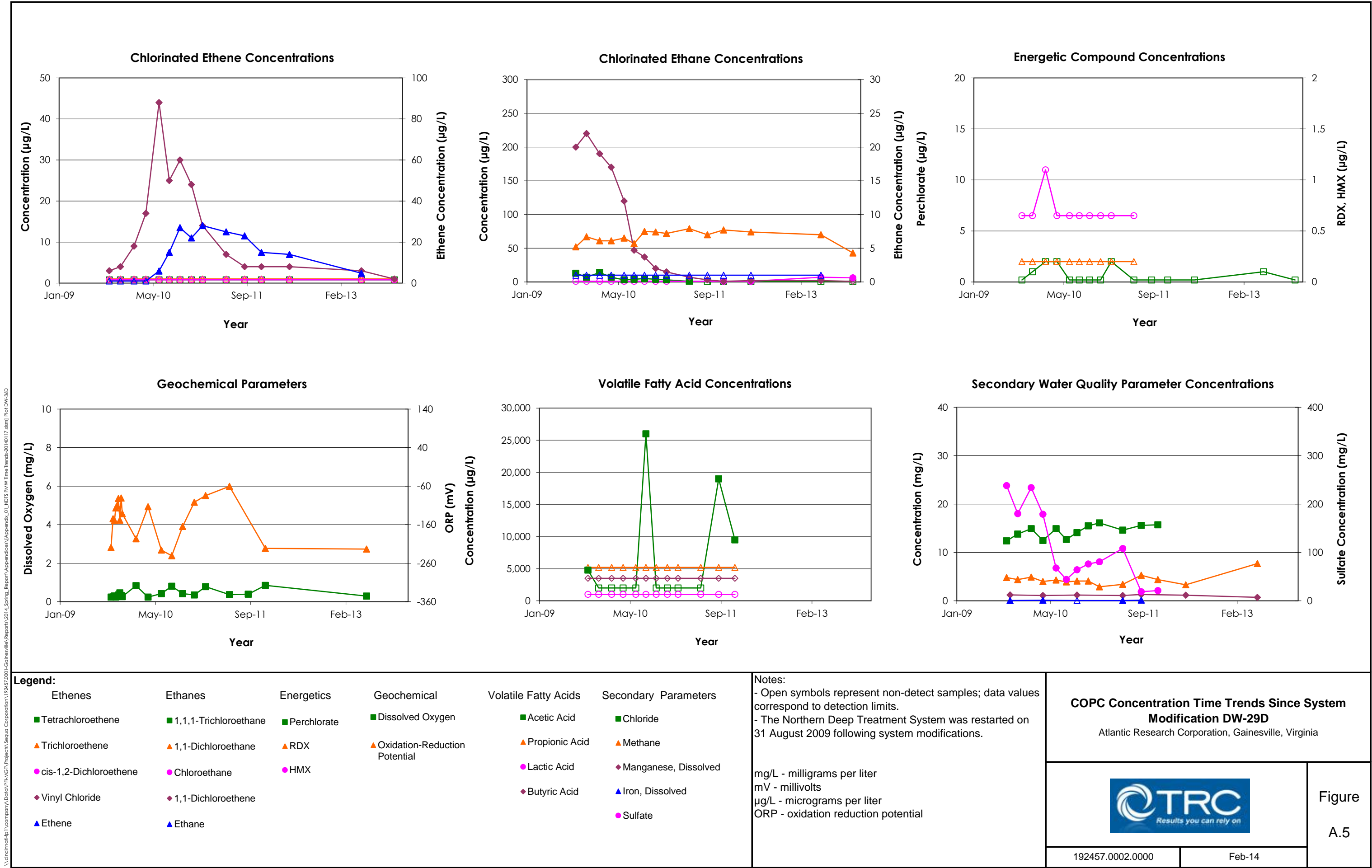


Figure  
A.3

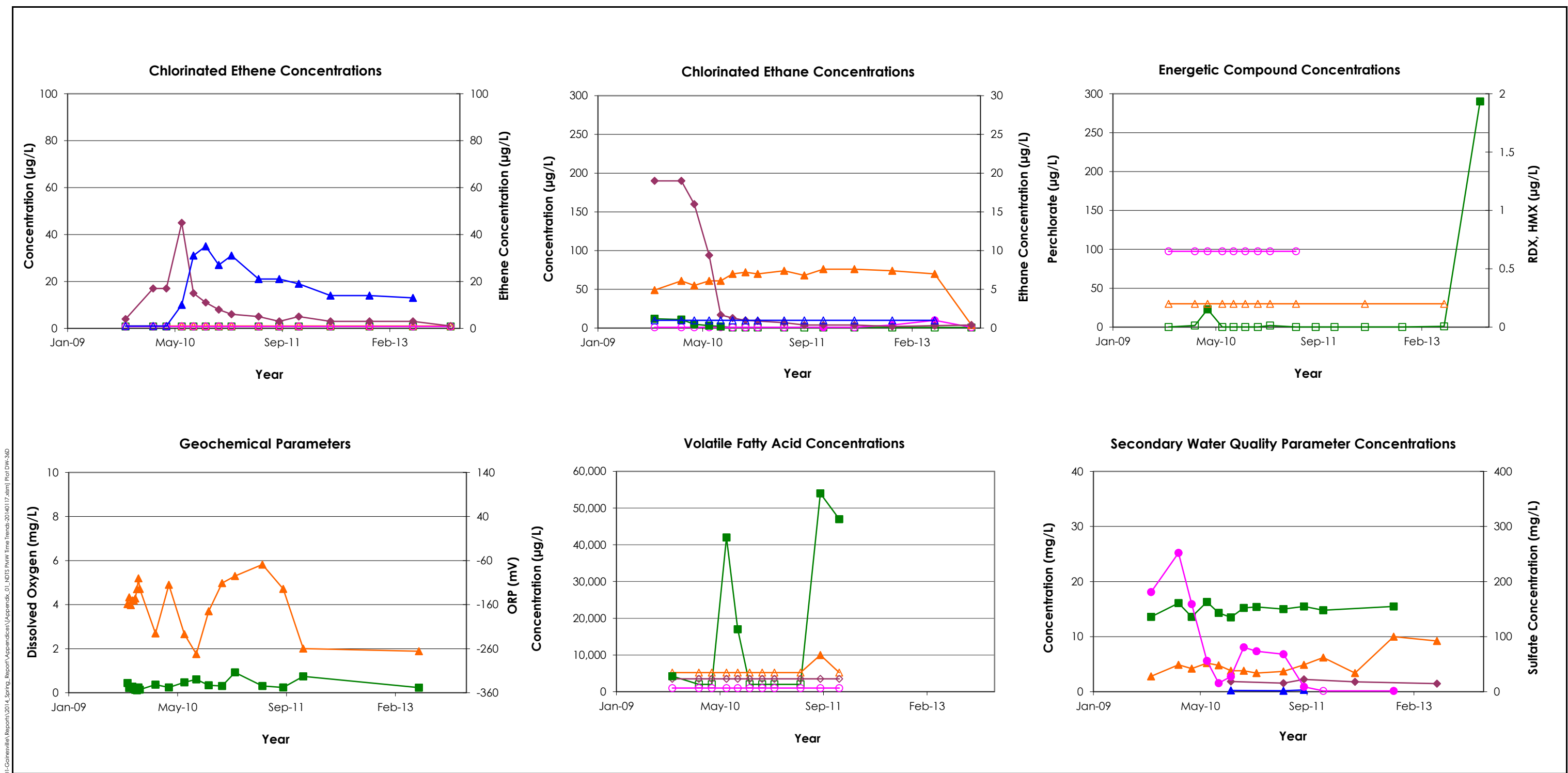
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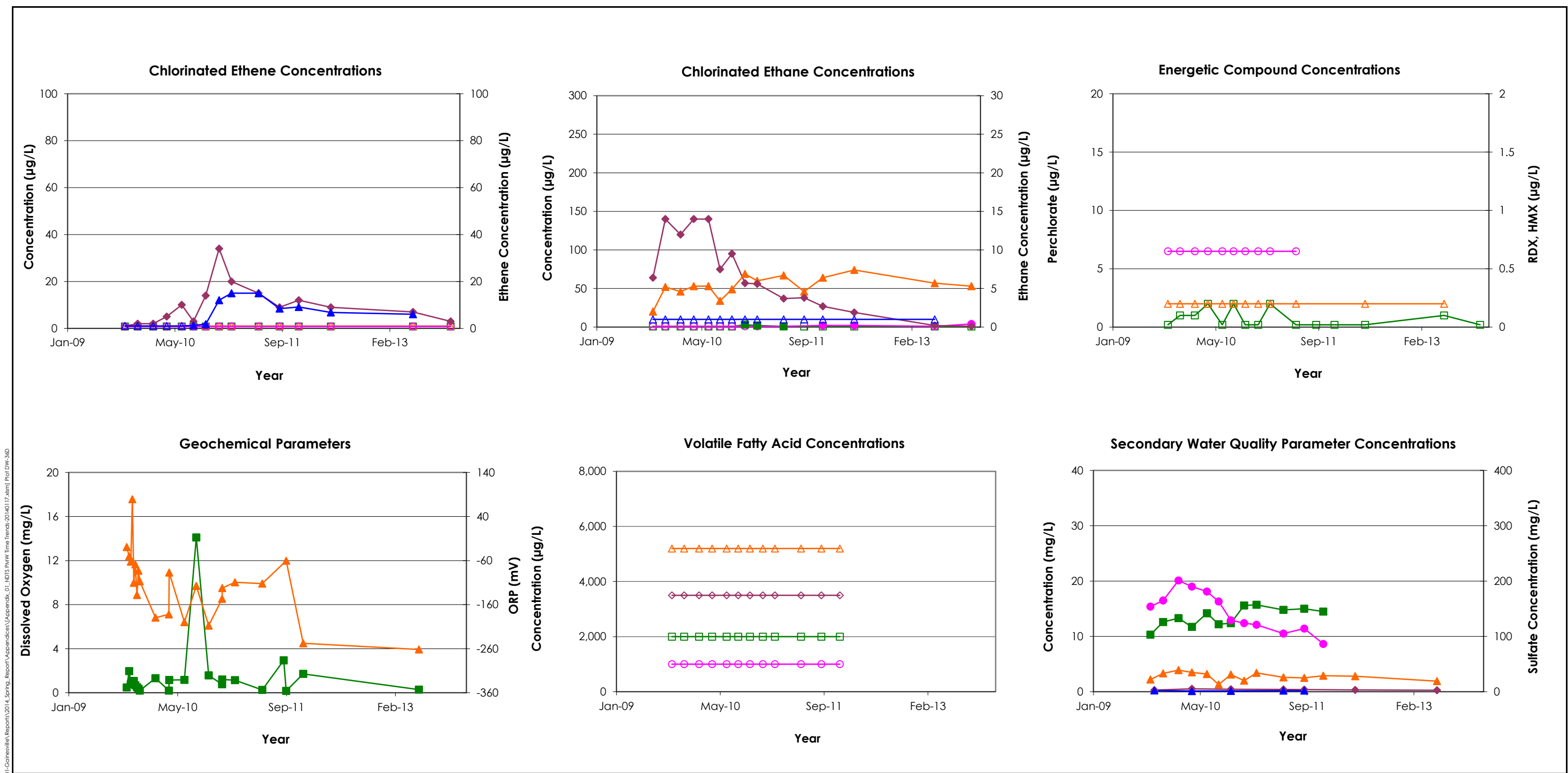


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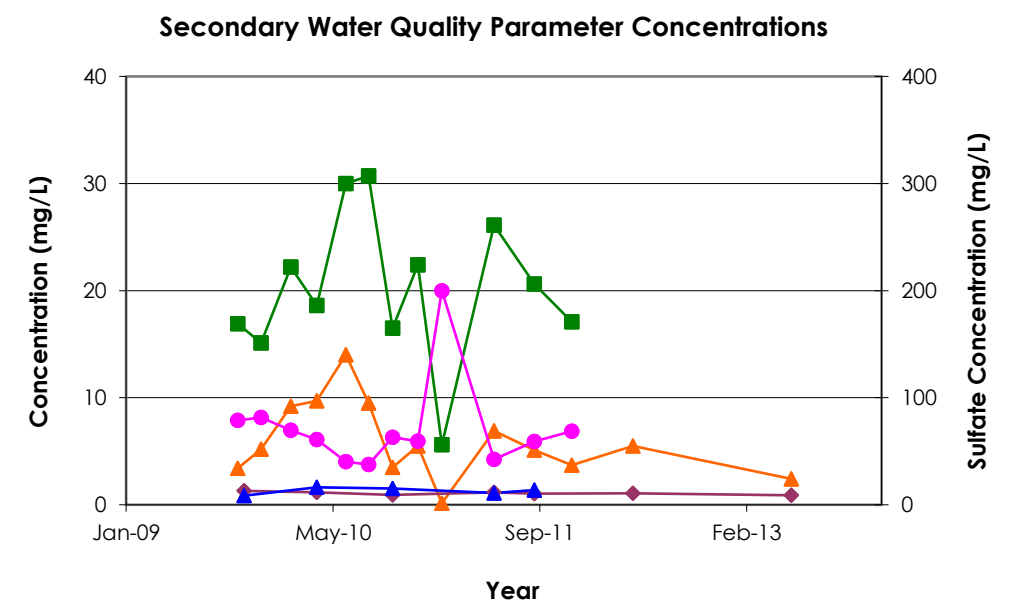
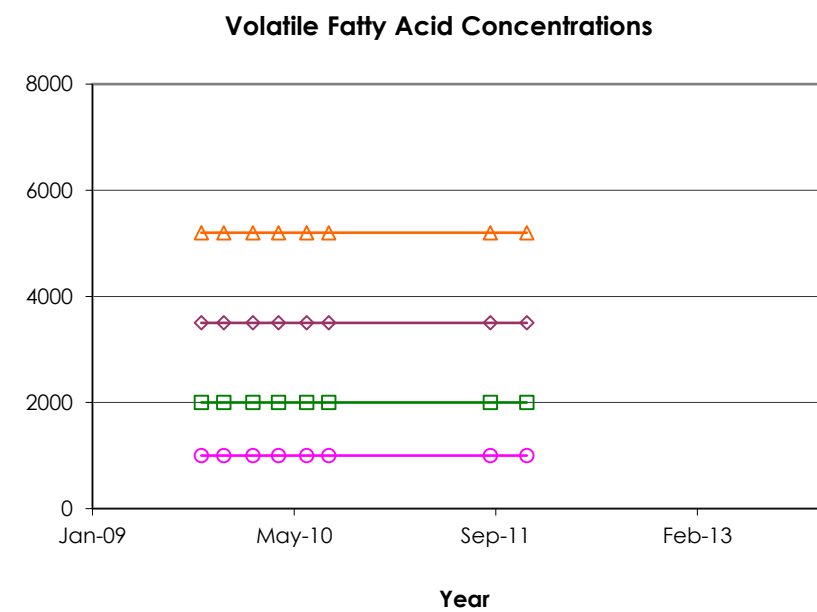
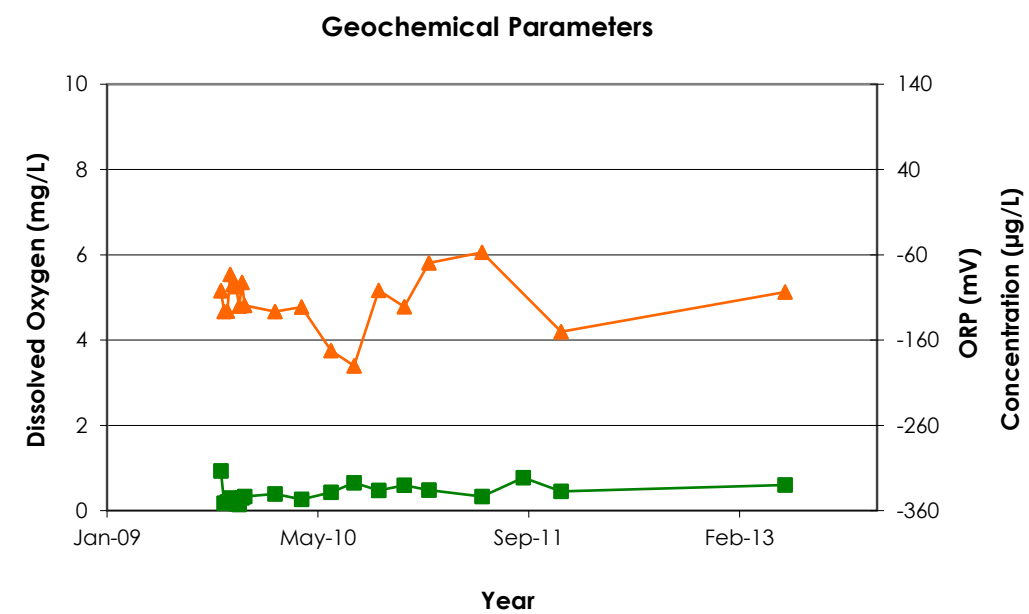
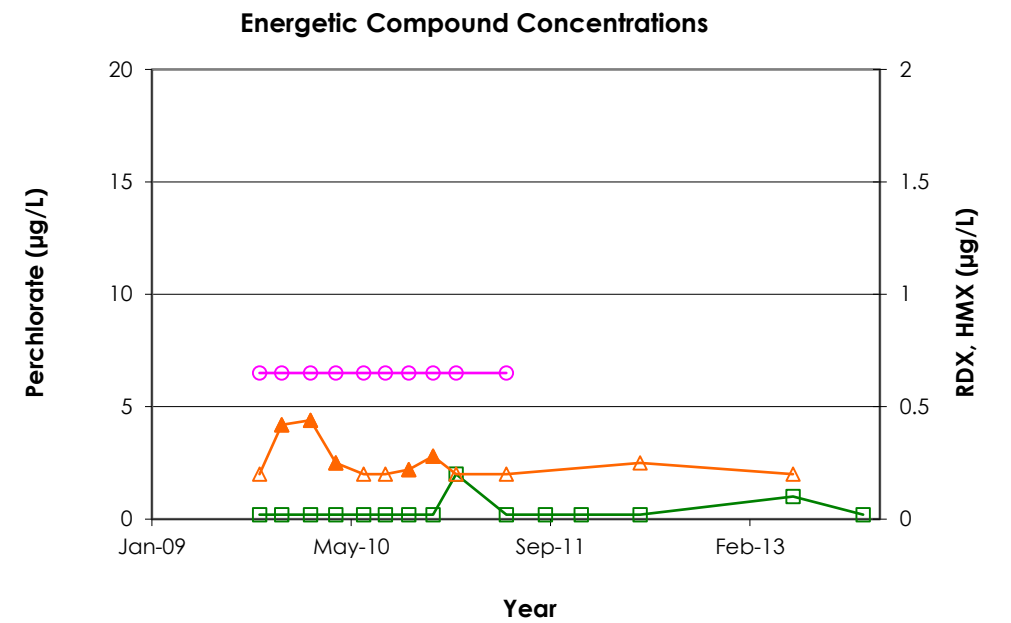
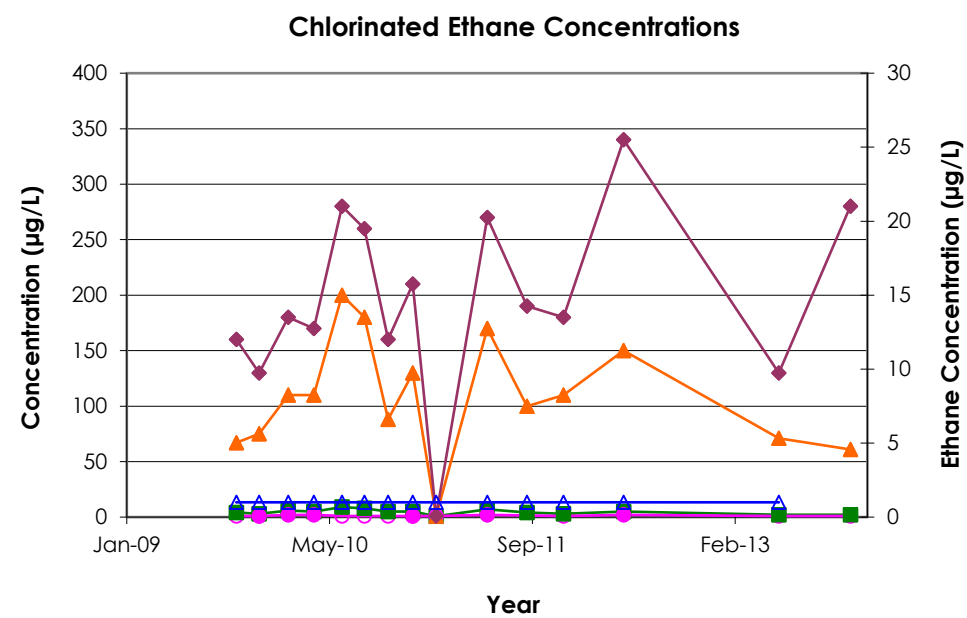
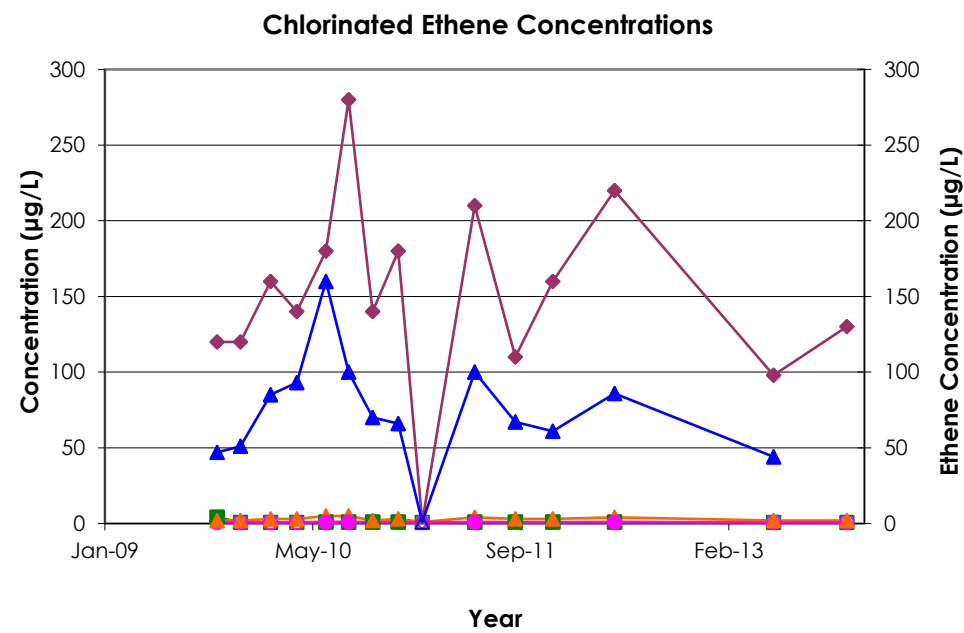


<b>Legend:</b>						<b>Notes:</b> - Open symbols represent non-detect samples; data values correspond to detection limits. - The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.  mg/L - milligrams per liter mV - millivolts µg/L - micrograms per liter ORP - oxidation reduction potential	<b>COPC Concentration Time Trends Since System Modification DW-22</b> Atlantic Research Corporation, Gainesville, Virginia	
<b>Ethenes</b> ■ Tetrachloroethene ▲ Trichloroethene ● cis-1,2-Dichloroethene ◆ Vinyl Chloride ▲ Ethene	<b>Ethanes</b> ■ 1,1,1-Trichloroethane ▲ 1,1-Dichloroethane ● Chloroethane ◆ 1,1-Dichloroethene ▲ Ethane	<b>Energetics</b> ■ Perchlorate ▲ RDX ● HMX	<b>Geochemical</b> ■ Dissolved Oxygen ▲ Oxidation-Reduction Potential	<b>Volatile Fatty Acids</b> ■ Acetic Acid ▲ Propionic Acid ● Lactic Acid ◆ Butyric Acid	<b>Secondary Parameters</b> ■ Chloride ▲ Methane ◆ Manganese, Dissolved ▲ Iron, Dissolved ● Sulfate			<b>Figure A.6</b>

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<b>Legend:</b>						<b>Notes:</b> - Open symbols represent non-detect samples; data values correspond to detection limits. - The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.  mg/L - milligrams per liter mV - millivolts µg/L - micrograms per liter ORP - oxidation reduction potential	<b>COPC Concentration Time Trends Since System Modification DW-29I</b> Atlantic Research Corporation, Gainesville, Virginia		
<div><div><b>Ethenes</b><ul style="list-style-type: none"><li>Tetrachloroethene</li><li>Trichloroethene</li><li>cis-1,2-Dichloroethene</li><li>Vinyl Chloride</li><li>Ethene</li></ul></div><div><b>Ethanes</b><ul style="list-style-type: none"><li>1,1,1-Trichloroethane</li><li>1,1-Dichloroethane</li><li>Chloroethane</li><li>1,1-Dichloroethene</li><li>Ethane</li></ul></div><div><b>Energetics</b><ul style="list-style-type: none"><li>Perchlorate</li><li>RDX</li><li>HMX</li></ul></div><div><b>Geochemical</b><ul style="list-style-type: none"><li>Dissolved Oxygen</li><li>Oxidation-Reduction Potential</li></ul></div><div><b>Volatile Fatty Acids</b><ul style="list-style-type: none"><li>Acetic Acid</li><li>Propionic Acid</li><li>Lactic Acid</li><li>Butyric Acid</li></ul></div><div><b>Secondary Parameters</b><ul style="list-style-type: none"><li>Chloride</li><li>Methane</li><li>Manganese, Dissolved</li><li>Iron, Dissolved</li><li>Sulfate</li></ul></div></div>									<b>Figure A.7</b>
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**Legend:**

Ethenes	Ethanes	Energetics	Geochemical	Volatile Fatty Acids	Secondary Parameters
■ Tetrachloroethene	■ 1,1,1-Trichloroethane	■ Perchlorate	■ Dissolved Oxygen	■ Acetic Acid	■ Chloride
▲ Trichloroethene	▲ 1,1-Dichloroethane	● HMX	▲ Oxidation-Reduction Potential	▲ Propionic Acid	▲ Methane
● cis-1,2-Dichloroethene	● Chloroethane	▲ RDX		● Lactic Acid	◆ Manganese, Dissolved
◆ Vinyl Chloride	◆ 1,1-Dichloroethene			◆ Butyric Acid	▲ Iron, Dissolved
▲ Ethene	▲ Ethane				● Sulfate

Notes:

- Open symbols represent non-detect samples; data values correspond to detection limits.
- The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.

mg/L - milligrams per liter  
mV - millivolts  
µg/L - micrograms per liter  
ORP - oxidation reduction potential

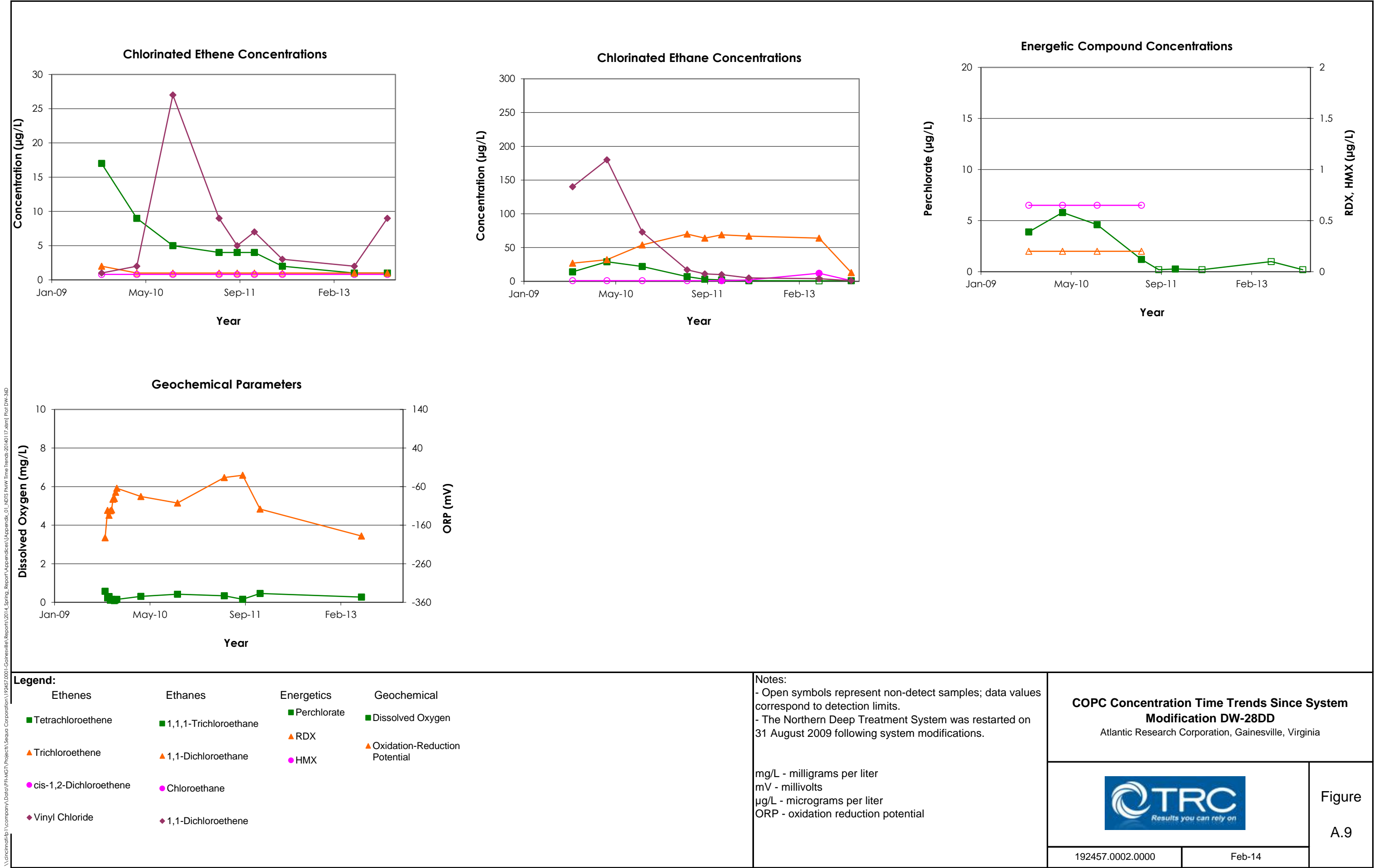
**COPC Concentration Time Trends Since System  
Modification DW-72B**  
Atlantic Research Corporation, Gainesville, Virginia

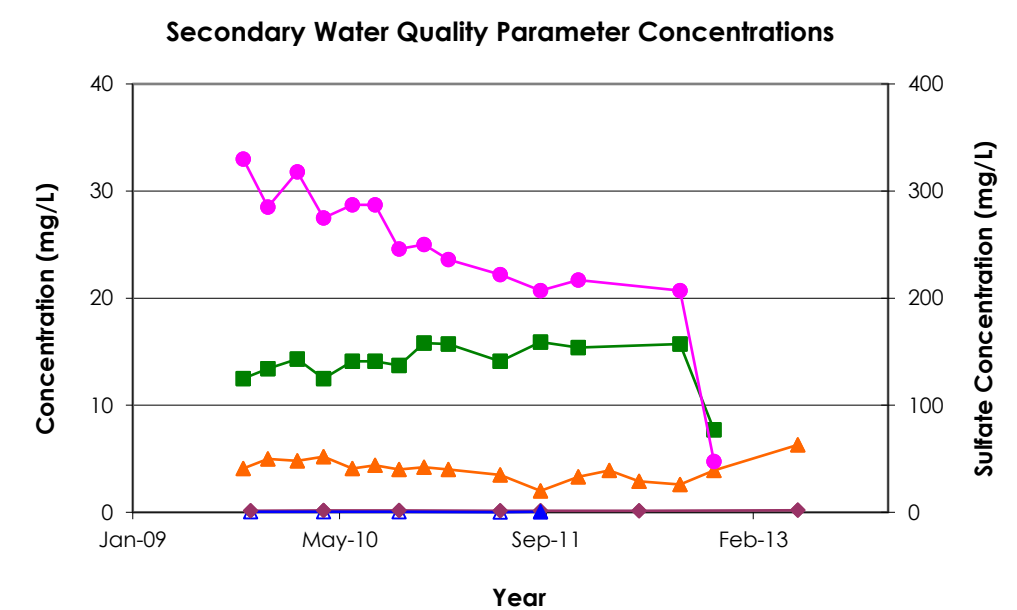
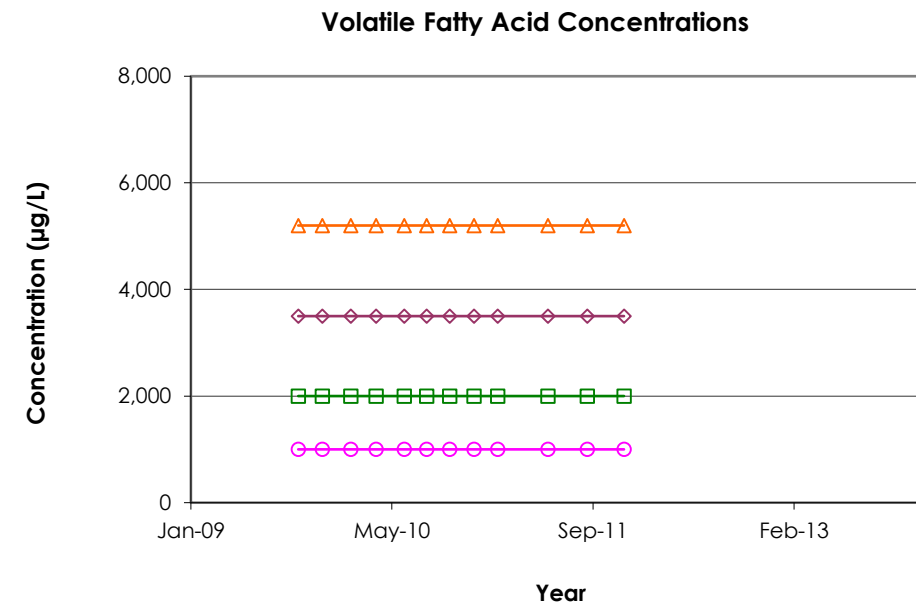
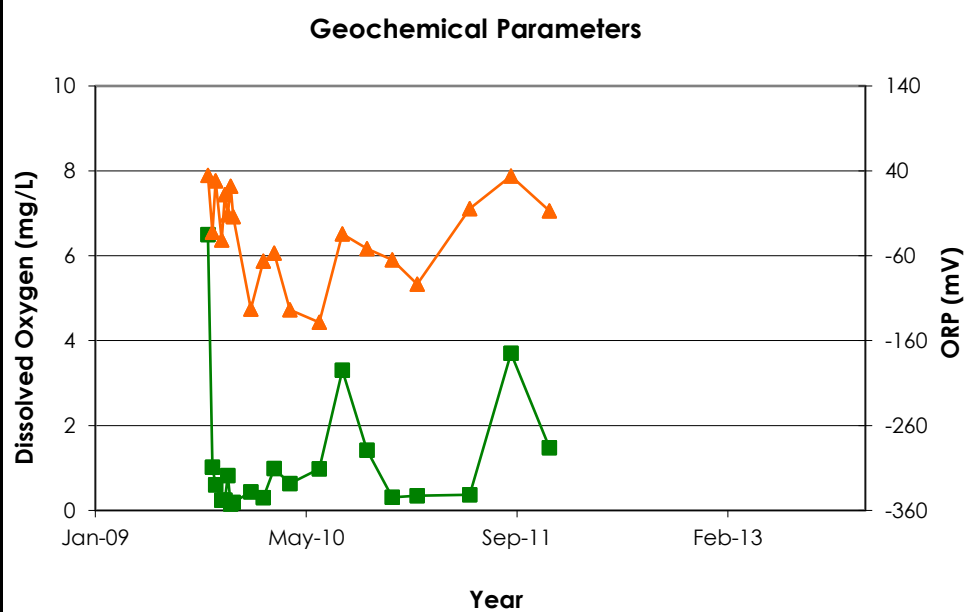
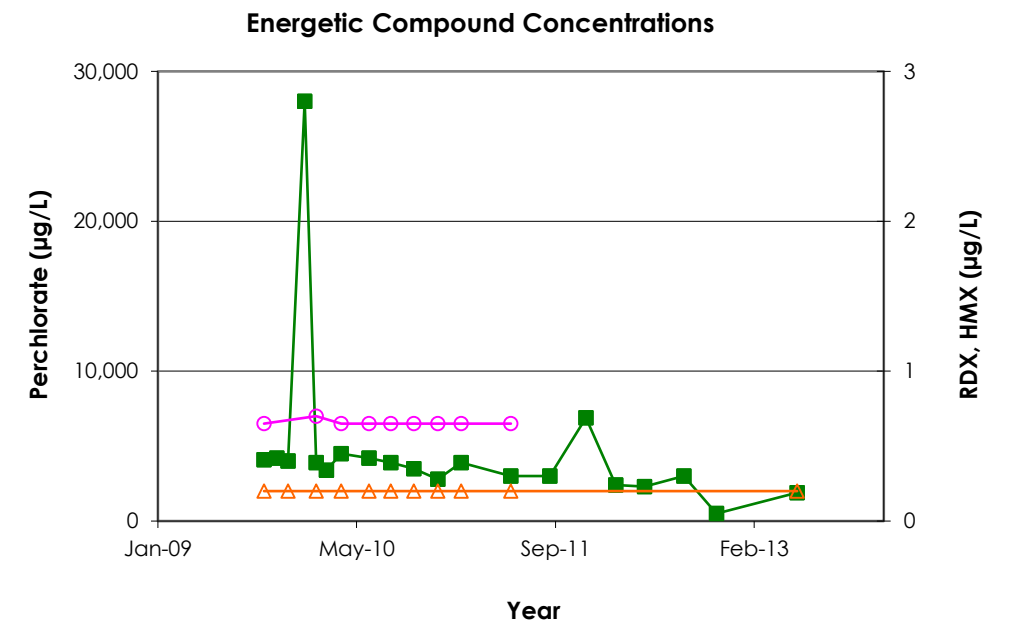
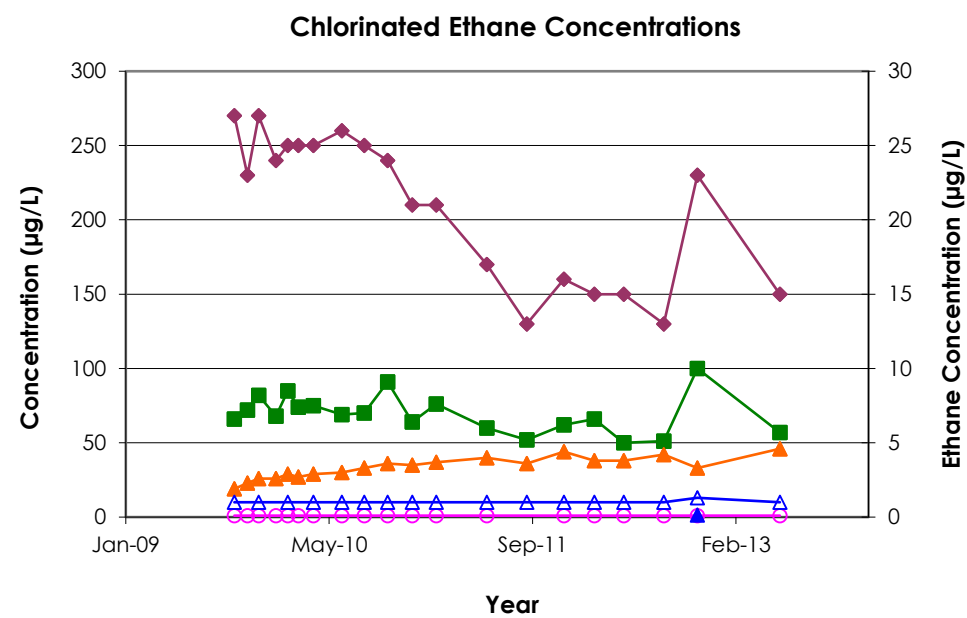
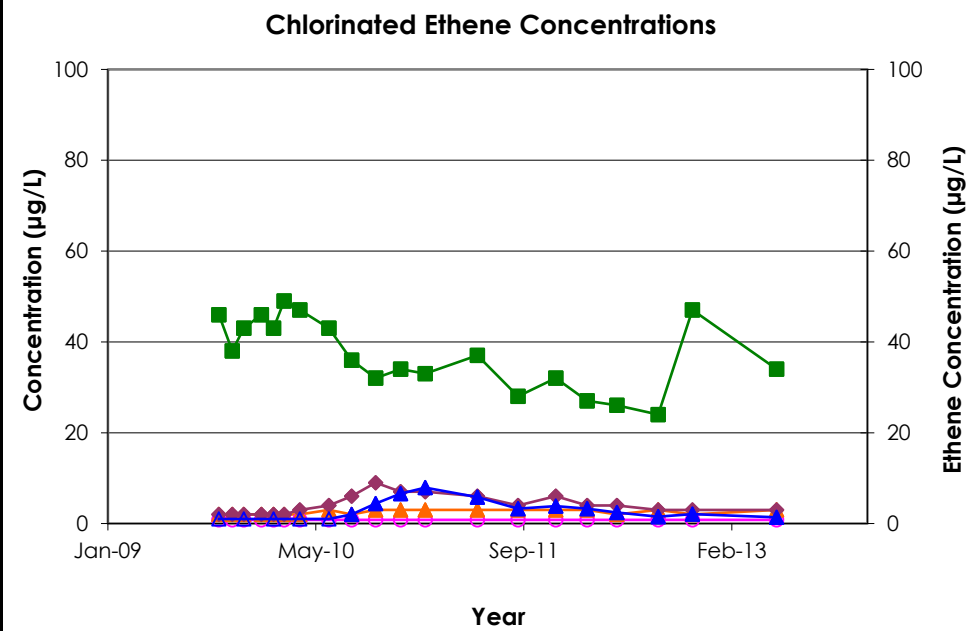


Figure  
A.8

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**Legend:**

Ethenes	Ethanes	Energetics	Geochemical	Volatile Fatty Acids	Secondary Parameters
■ Tetrachloroethene	■ 1,1,1-Trichloroethane	■ Perchlorate	■ Dissolved Oxygen	■ Acetic Acid	■ Chloride
▲ Trichloroethene	▲ 1,1-Dichloroethane	▲ RDX	▲ Oxidation-Reduction Potential	▲ Propionic Acid	▲ Methane
● cis-1,2-Dichloroethene	● Chloroethane	● HMX		● Lactic Acid	◆ Manganese, Dissolved
◆ Vinyl Chloride	◆ 1,1-Dichloroethene			◆ Butyric Acid	▲ Iron, Dissolved
▲ Ethene	▲ Ethane				● Sulfate

Notes:

- Open symbols represent non-detect samples; data values correspond to detection limits.
- The Northern Deep Treatment System was restarted on 31 August 2009 following system modifications.

mg/L - milligrams per liter  
mV - millivolts  
µg/L - micrograms per liter  
ORP - oxidation reduction potential

## COPC Concentration Time Trends Since System Modification DW-13

Atlantic Research Corporation, Gainesville, Virginia



Figure  
A.10

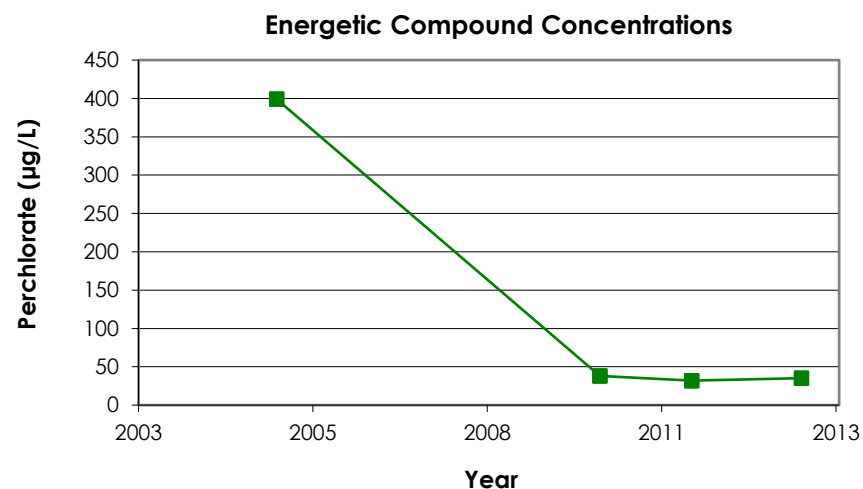
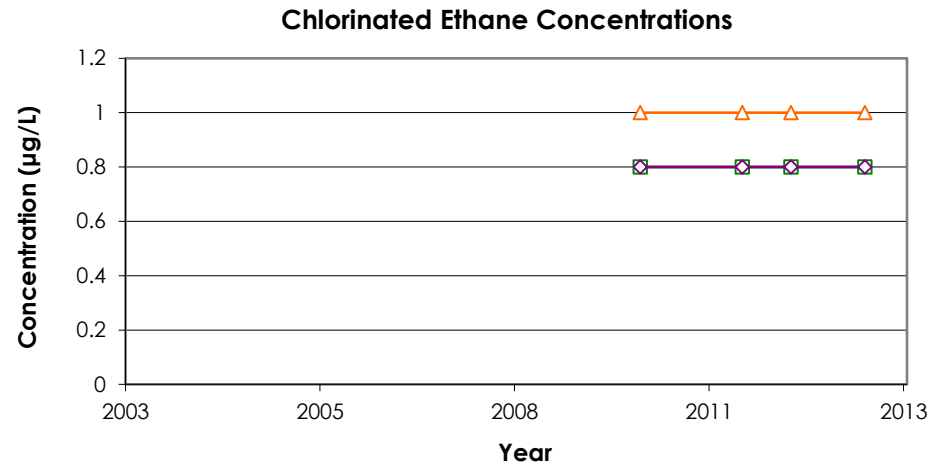
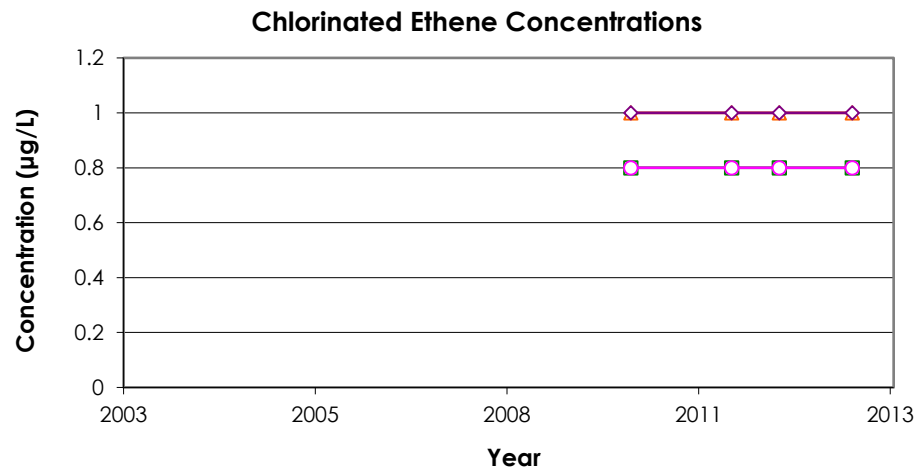
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## **APPENDIX B**

### **DEEP GROUND WATER WELL TIME TREND CHARTS**

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at BW 78-11D Atlantic Research Corporation, Gainesville, Virginia

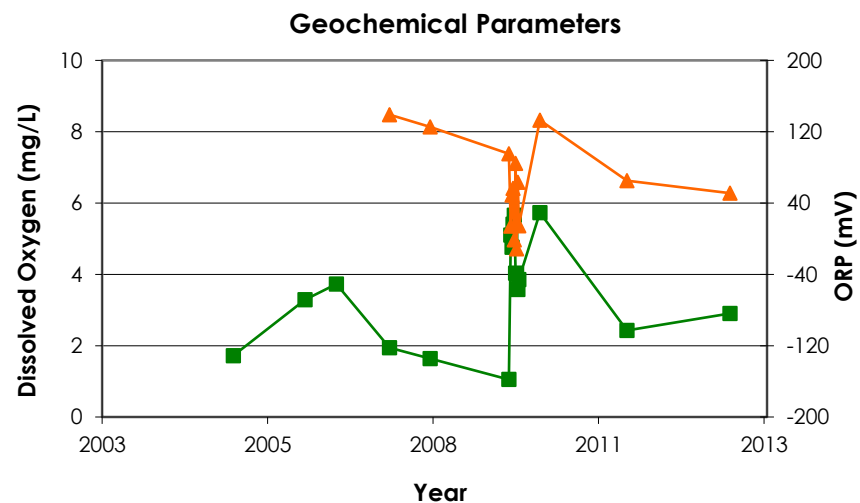
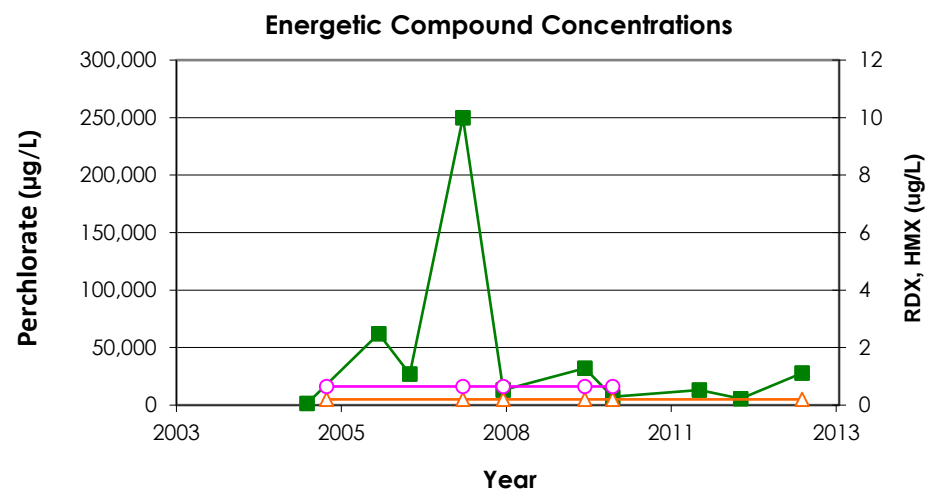
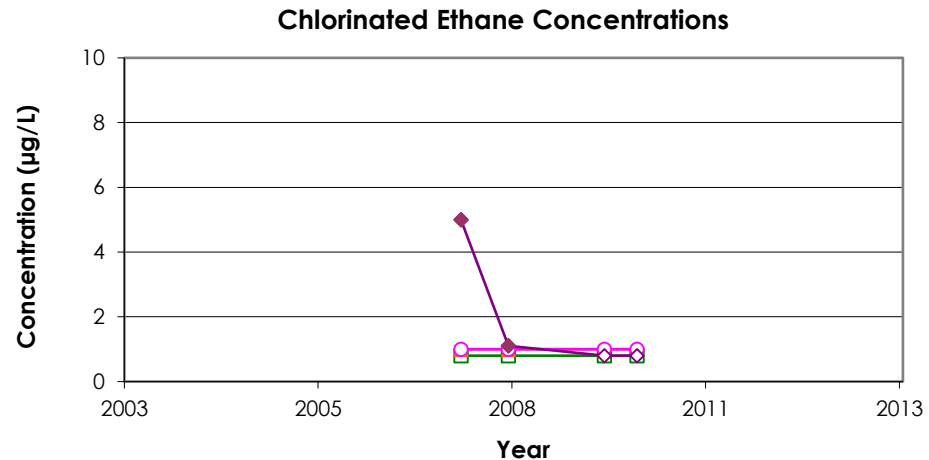
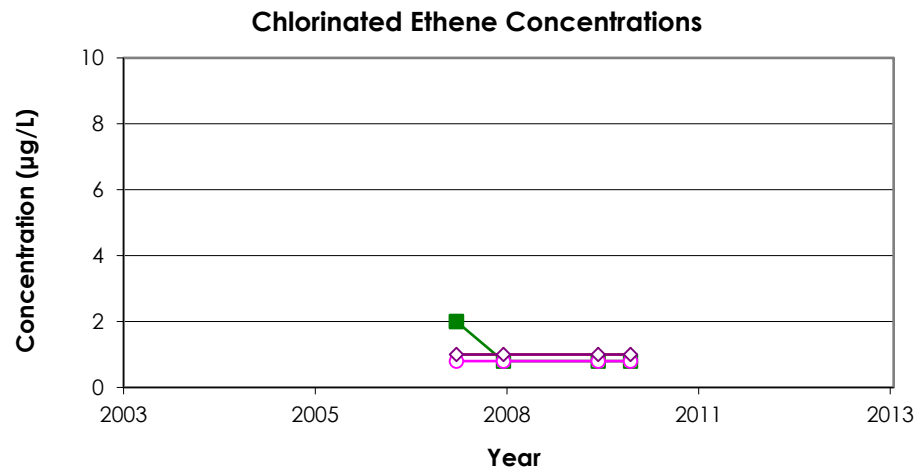


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Figure  
B.1

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at BW 78-12D

Atlantic Research Corporation, Gainesville, Virginia

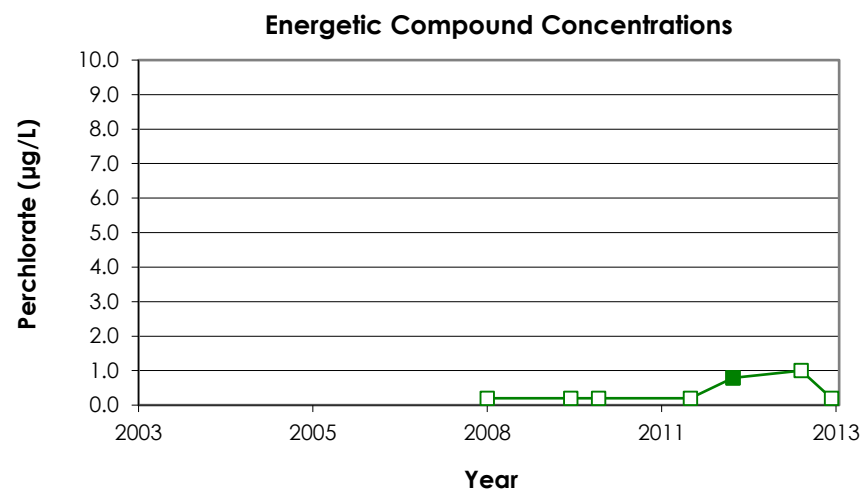
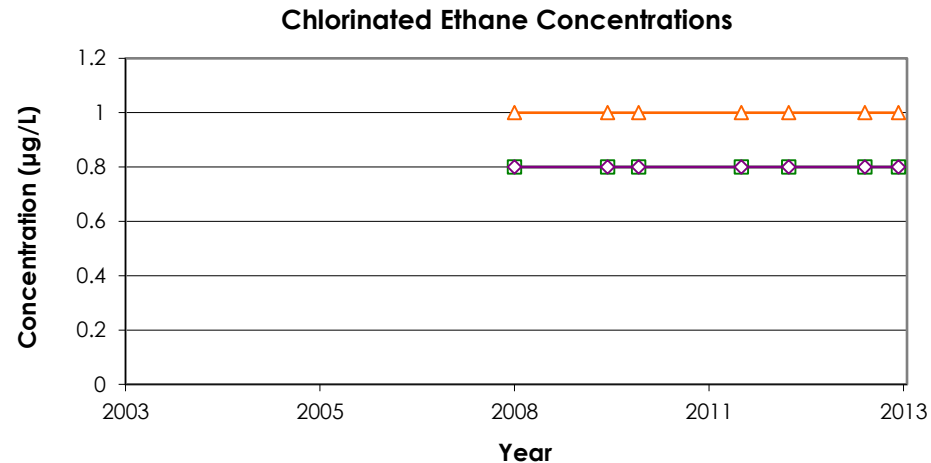
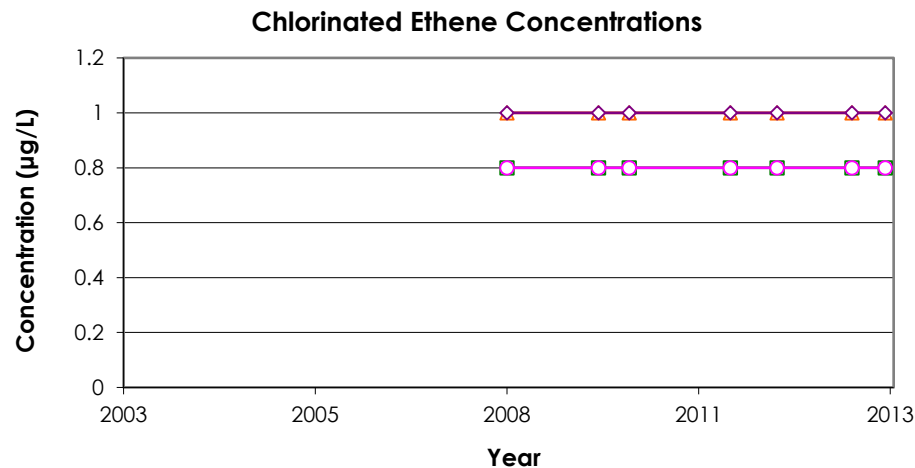


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Figure  
B.2

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW 200-01 Atlantic Research Corporation, Gainesville, Virginia

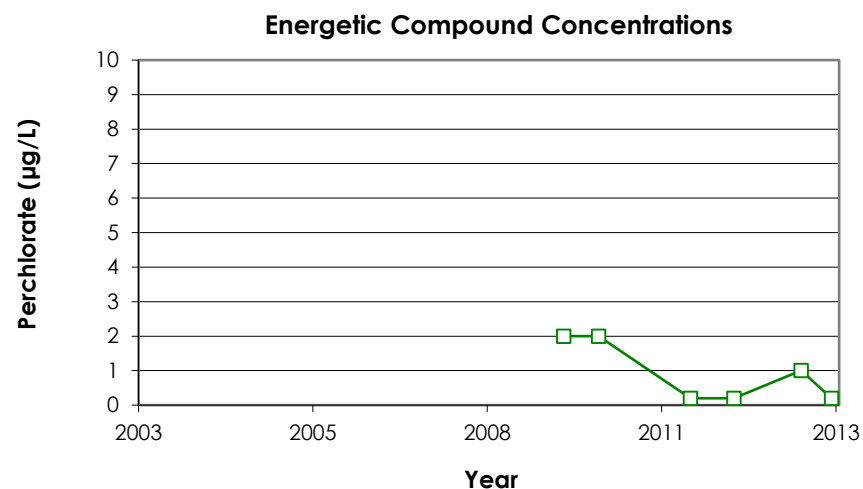
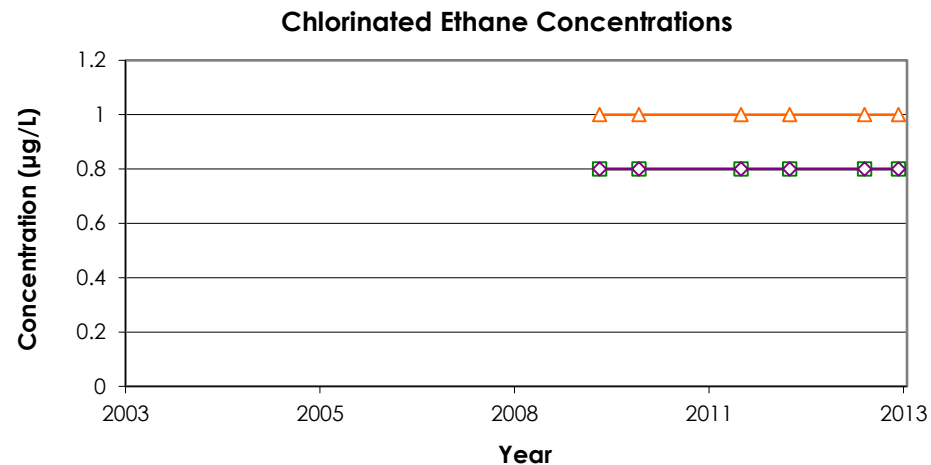
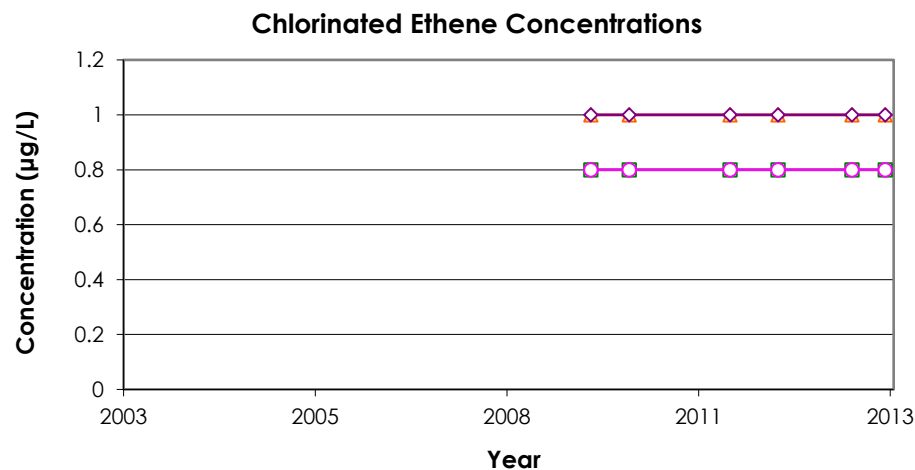


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Figure  
B.3

\\Vencima-fil-1\company\Date\VFH\G7\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix 02\_Deep Time Trend Plots-2014011



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW SB-01 Atlantic Research Corporation, Gainesville, Virginia

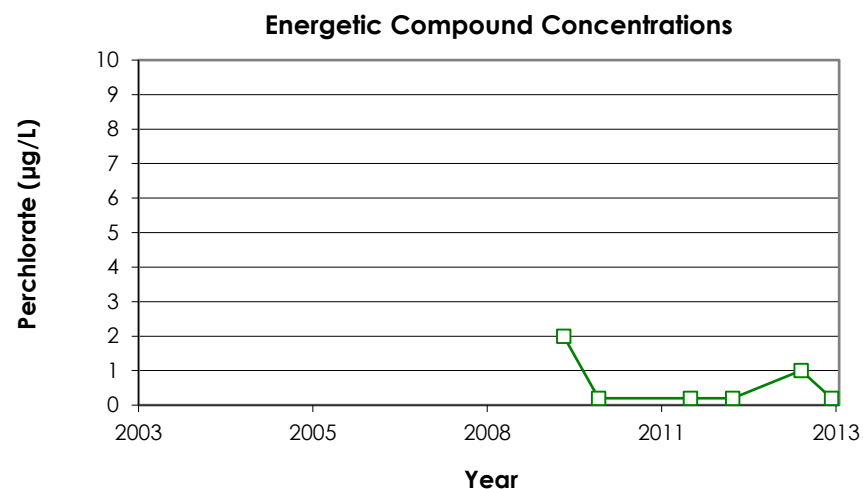
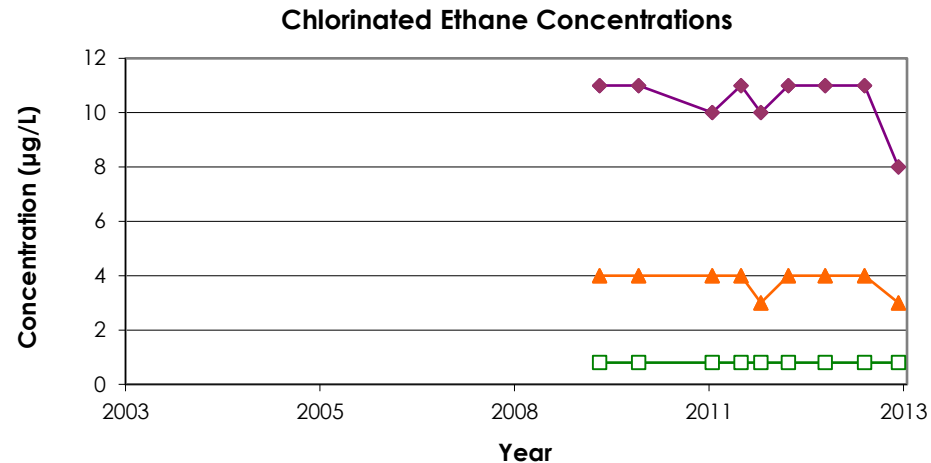
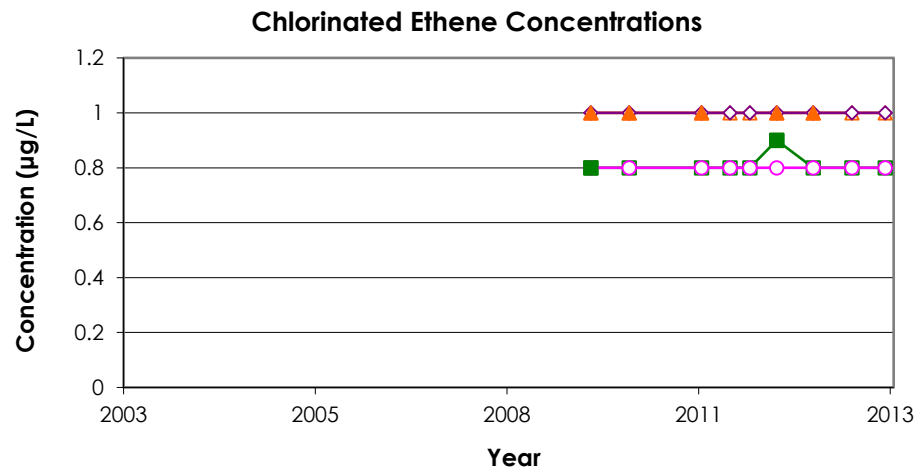


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Figure  
B.4

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW SB-02 Atlantic Research Corporation, Gainesville, Virginia

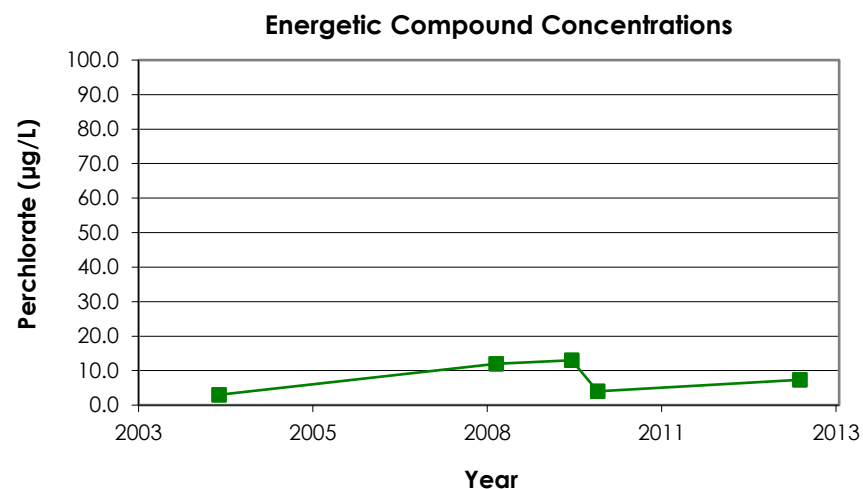
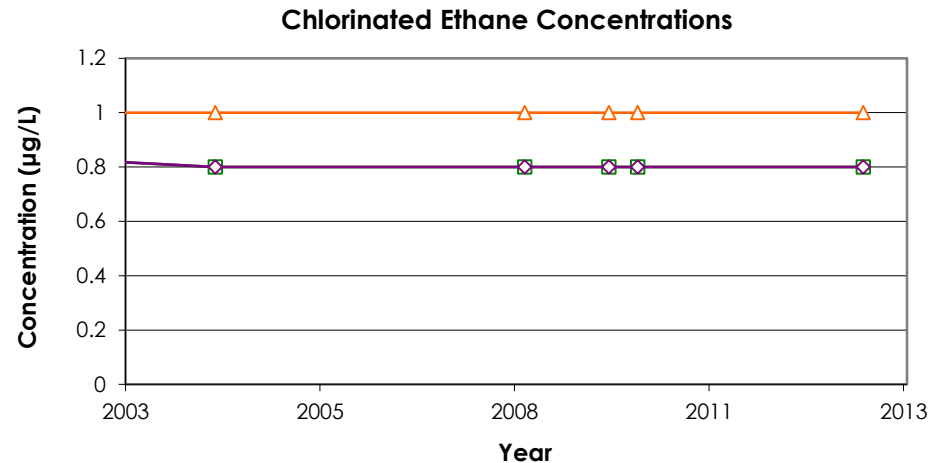
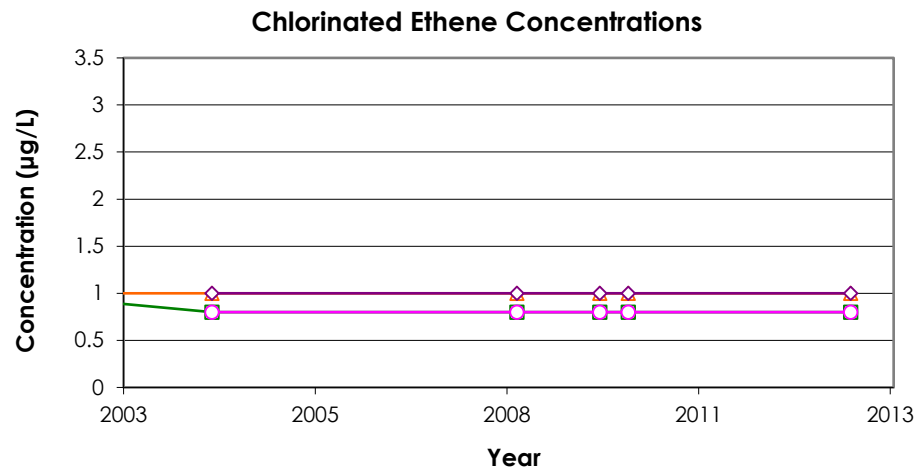


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Figure  
B.5

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-10 Atlantic Research Corporation, Gainesville, Virginia

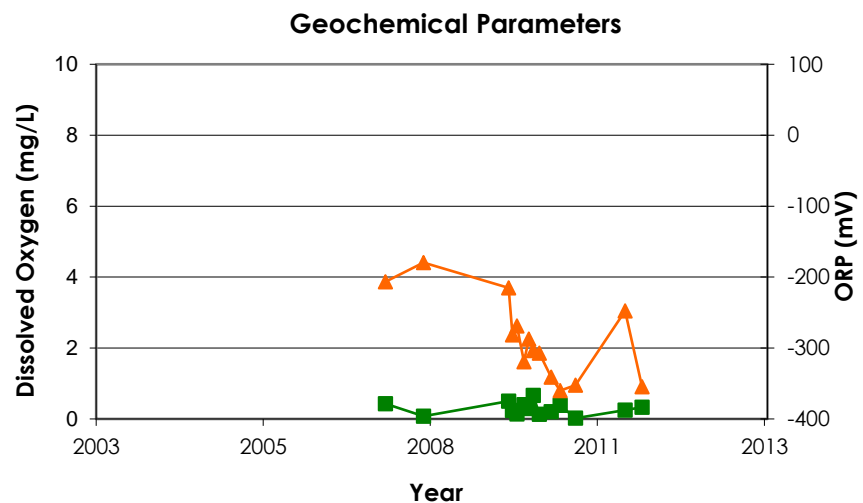
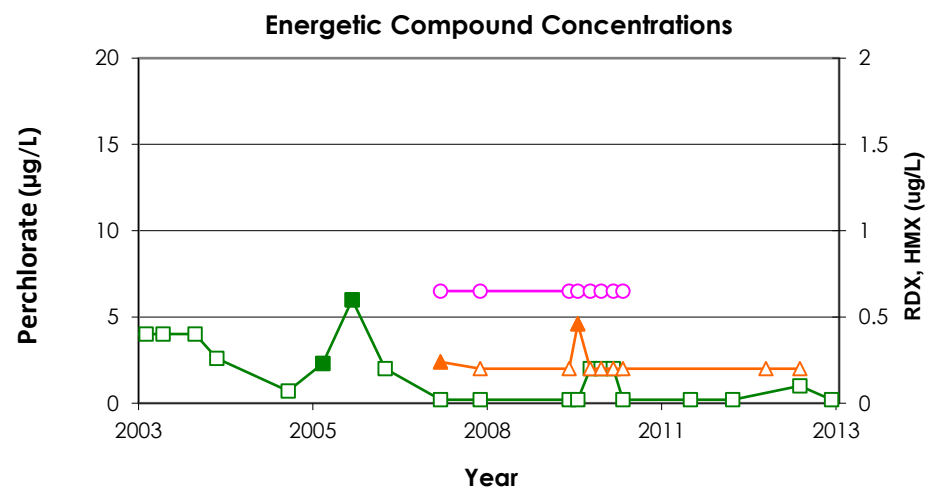
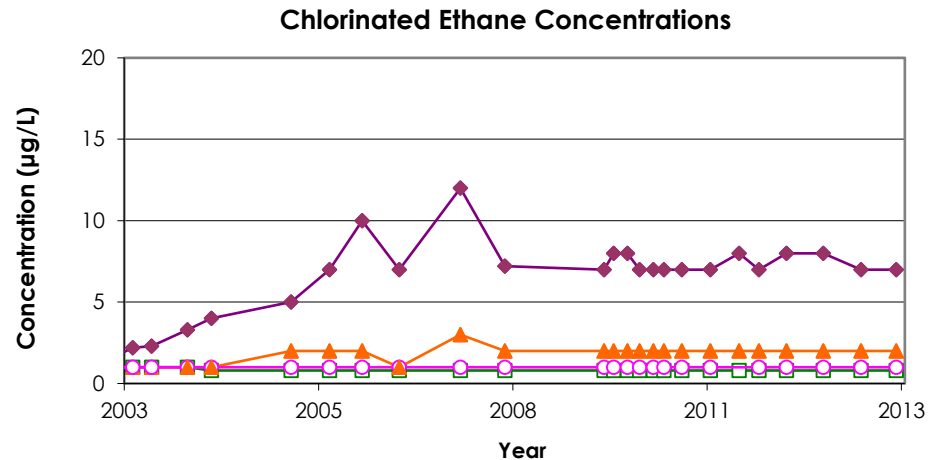
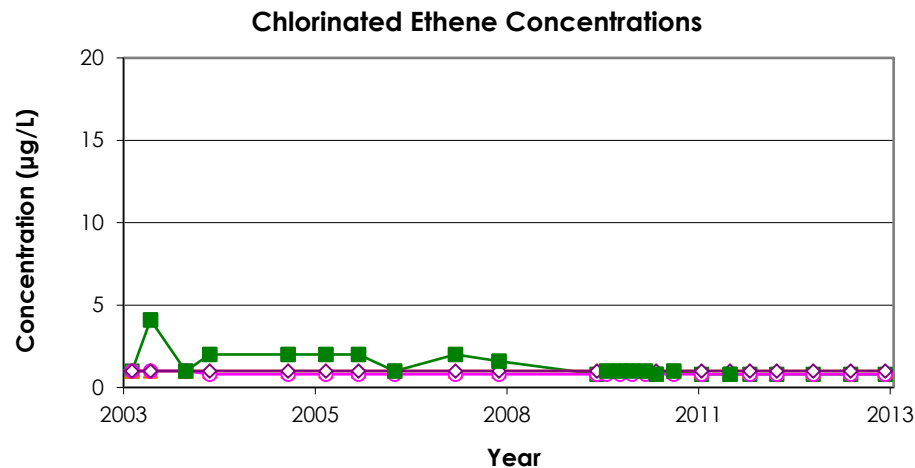


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Figure  
B.6

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-12

Atlantic Research Corporation, Gainesville, Virginia

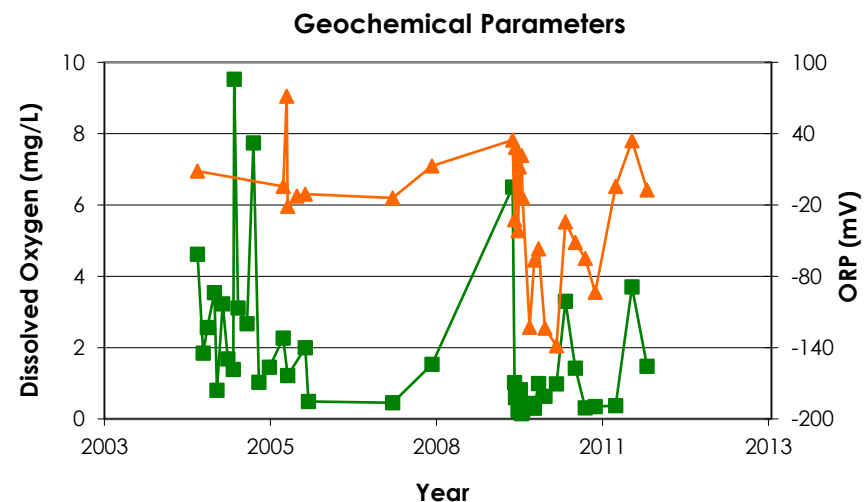
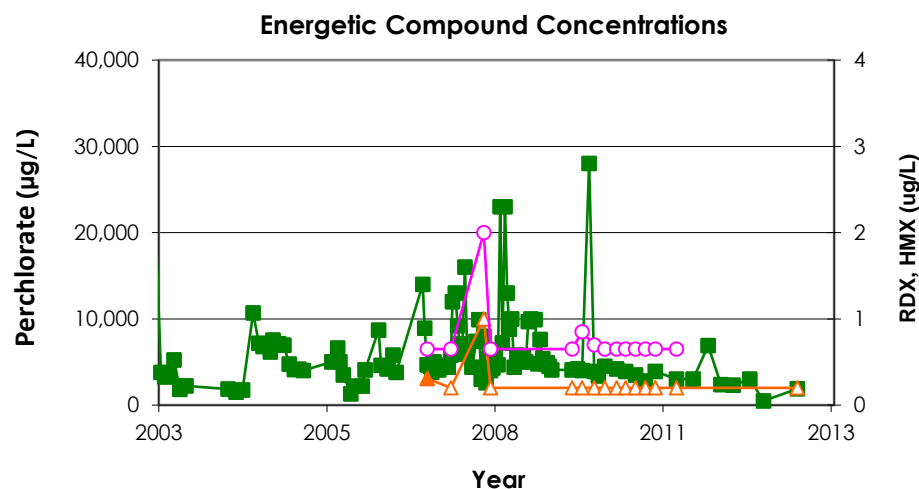
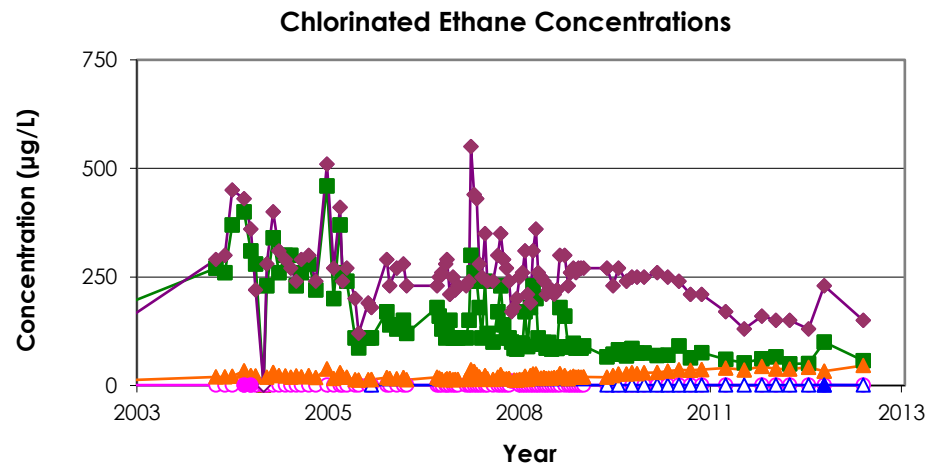
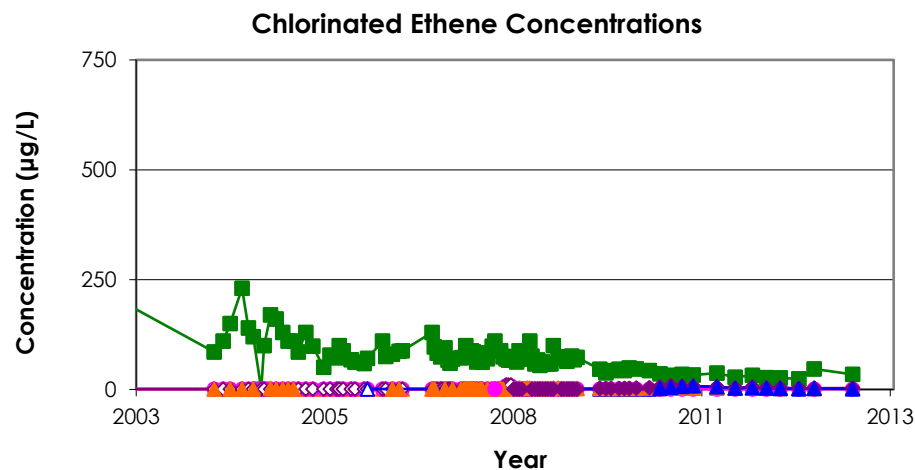


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Figure  
B.7

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-13

Atlantic Research Corporation, Gainesville, Virginia

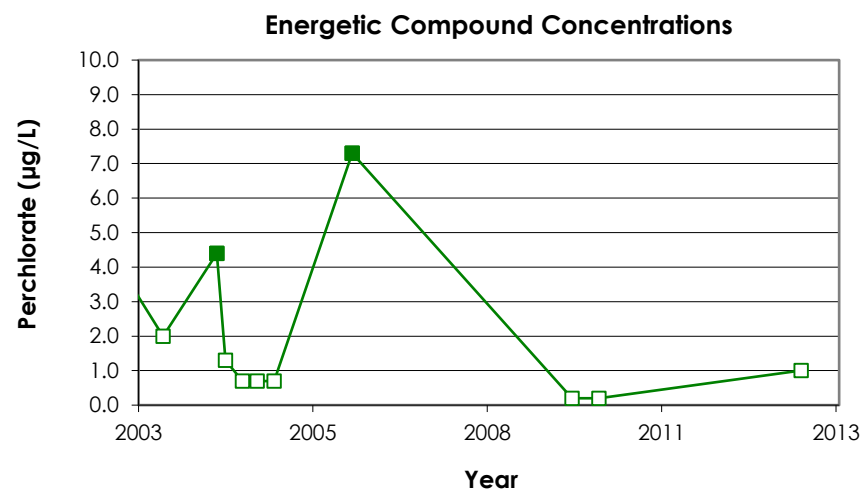
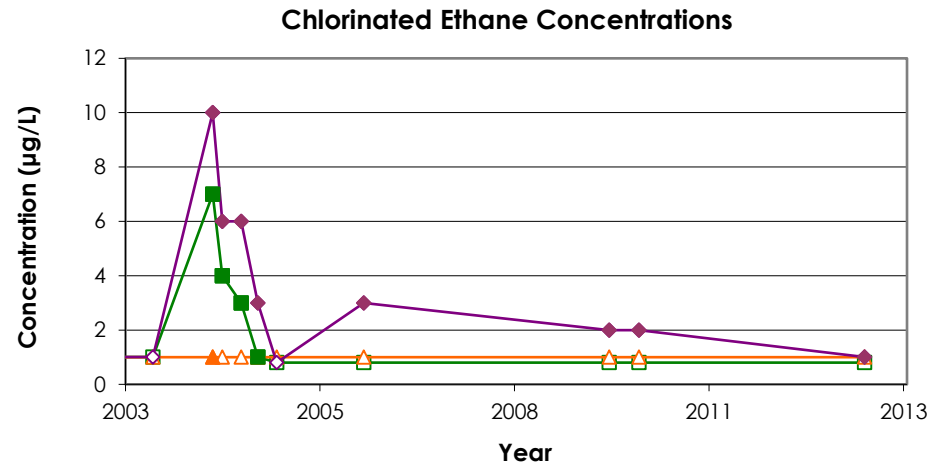
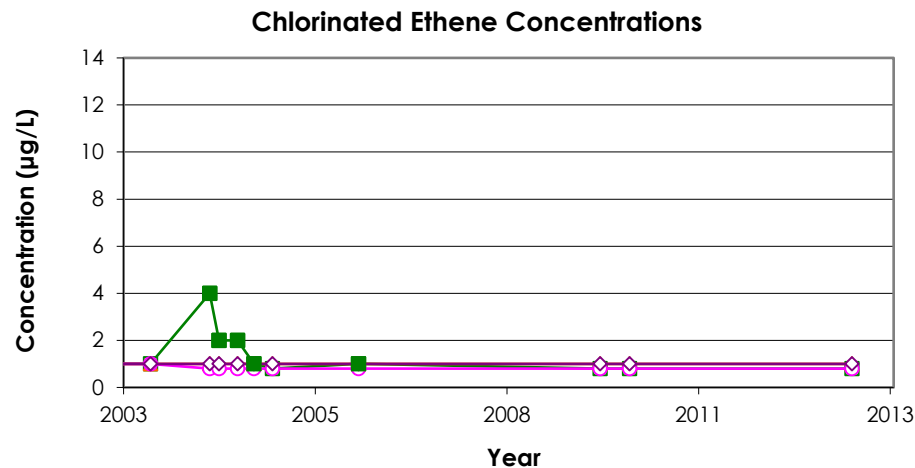


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-14 Atlantic Research Corporation, Gainesville, Virginia

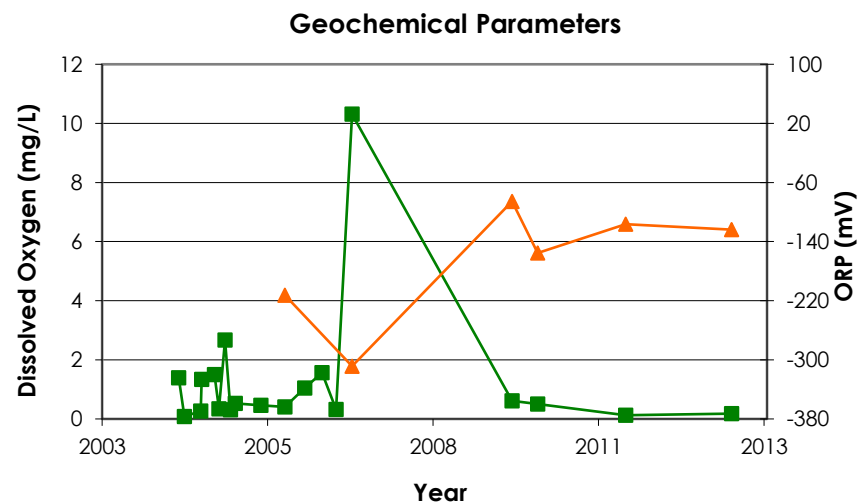
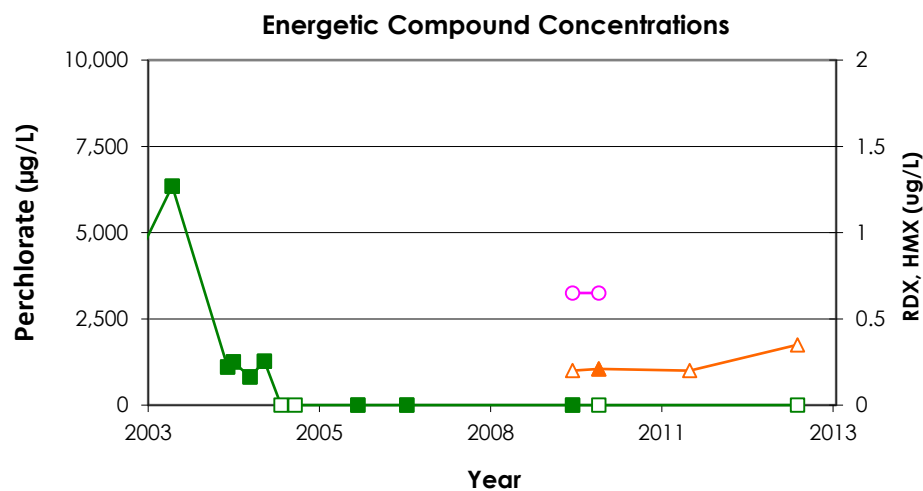
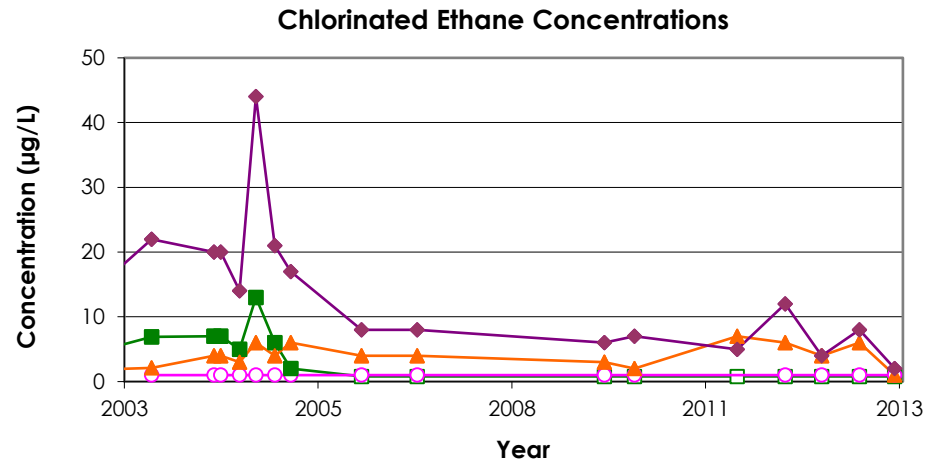
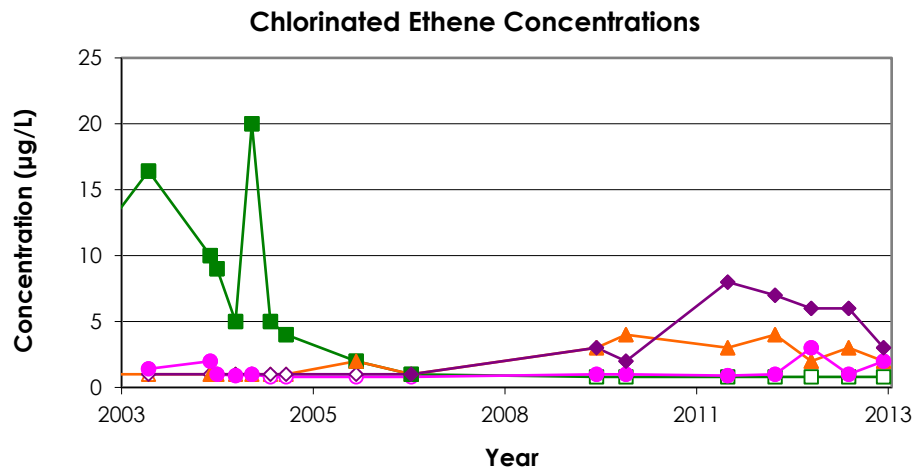


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-15

Atlantic Research Corporation, Gainesville, Virginia

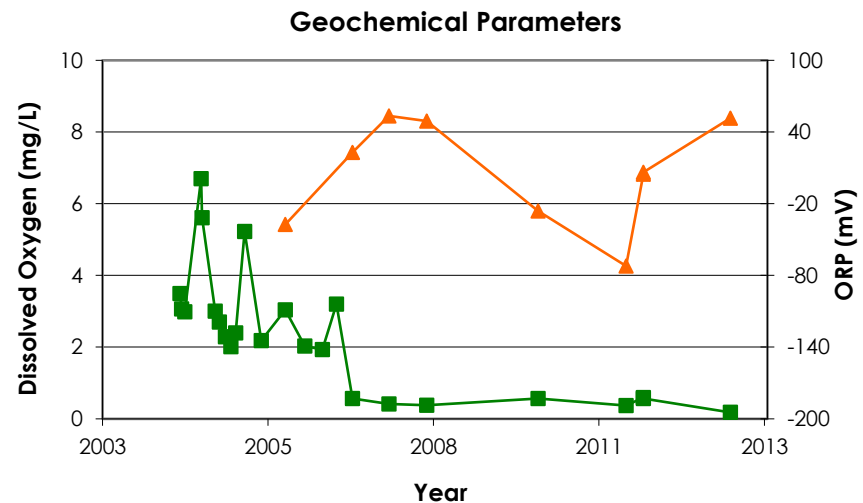
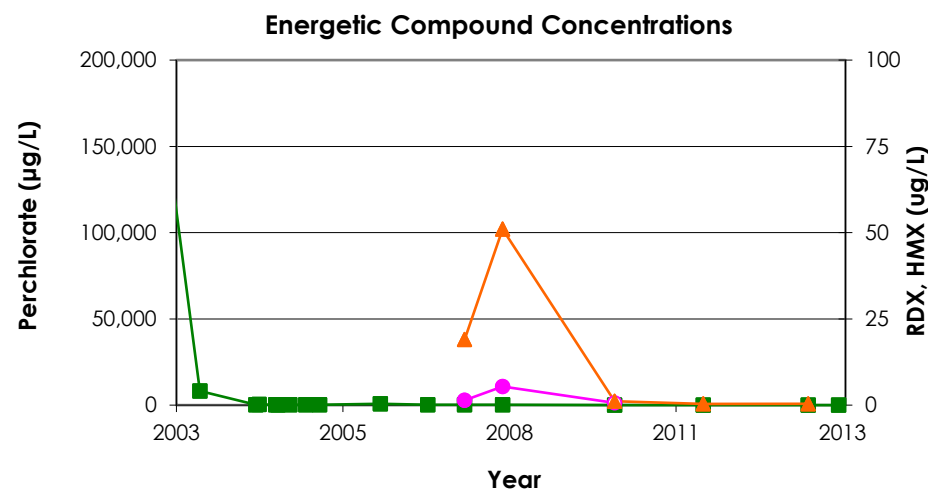
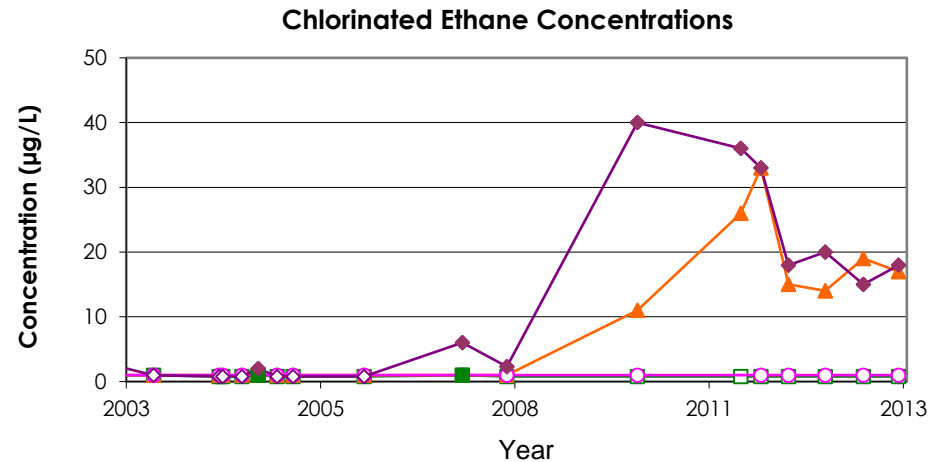
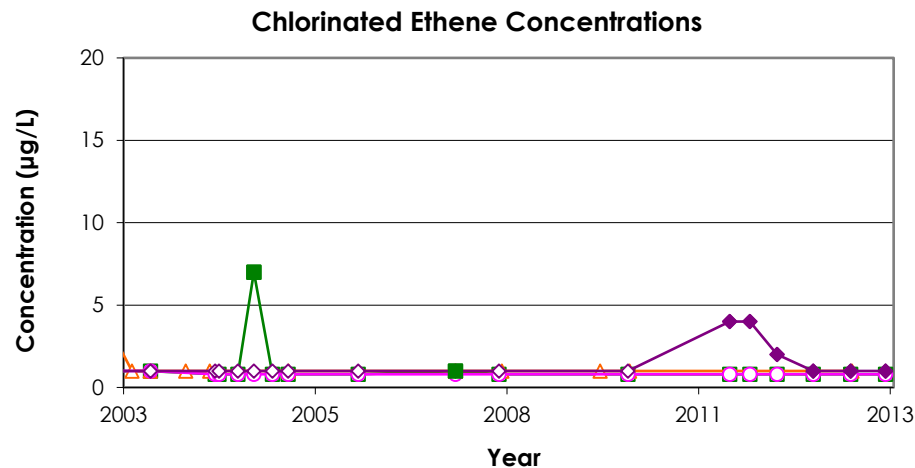


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-16

Atlantic Research Corporation, Gainesville, Virginia

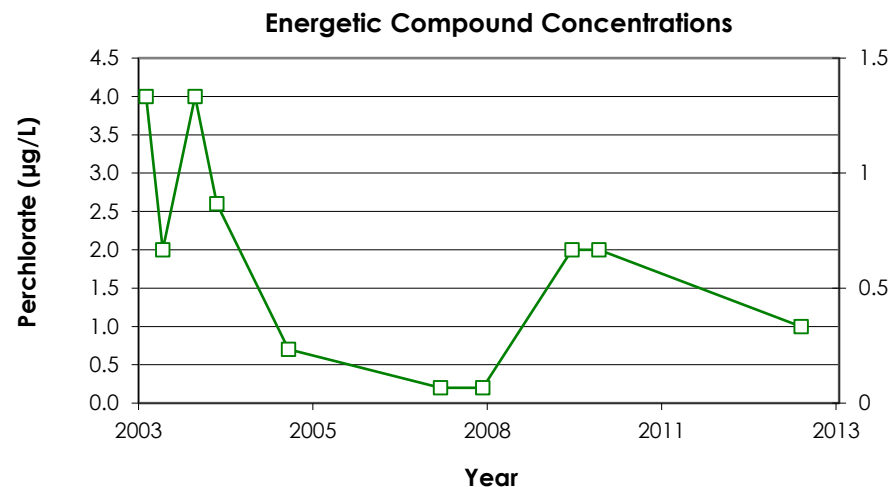
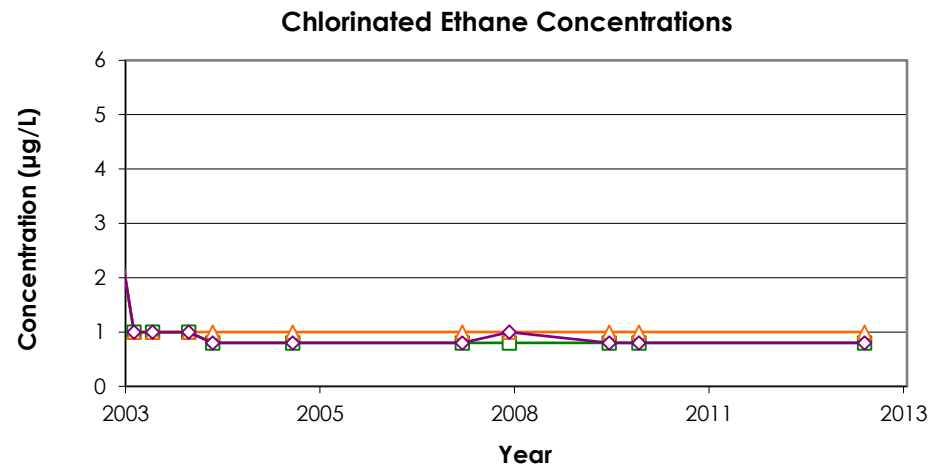
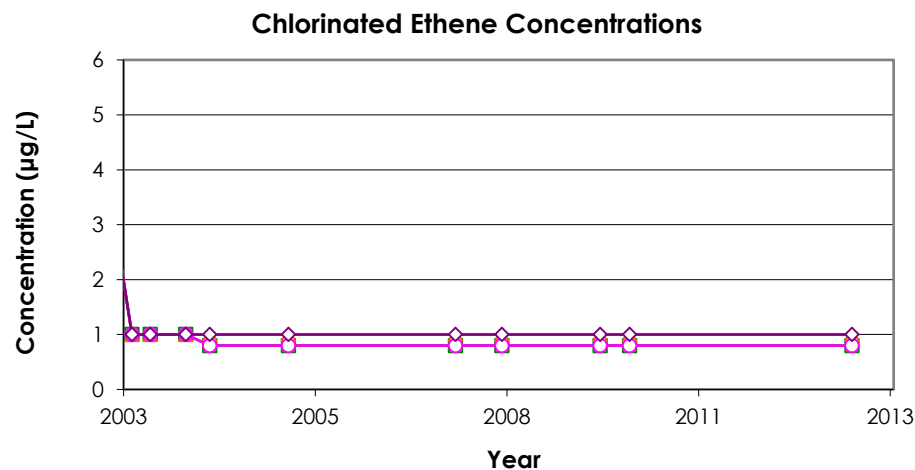


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Figure B.11

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-17 Atlantic Research Corporation, Gainesville, Virginia

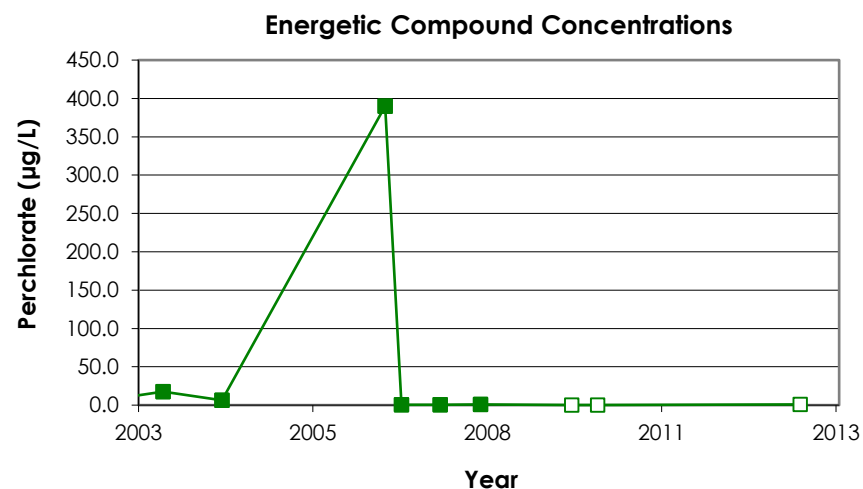
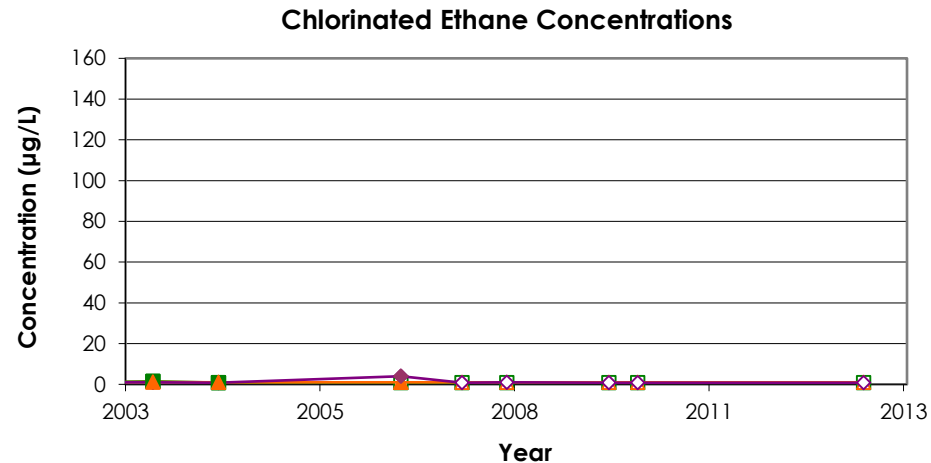
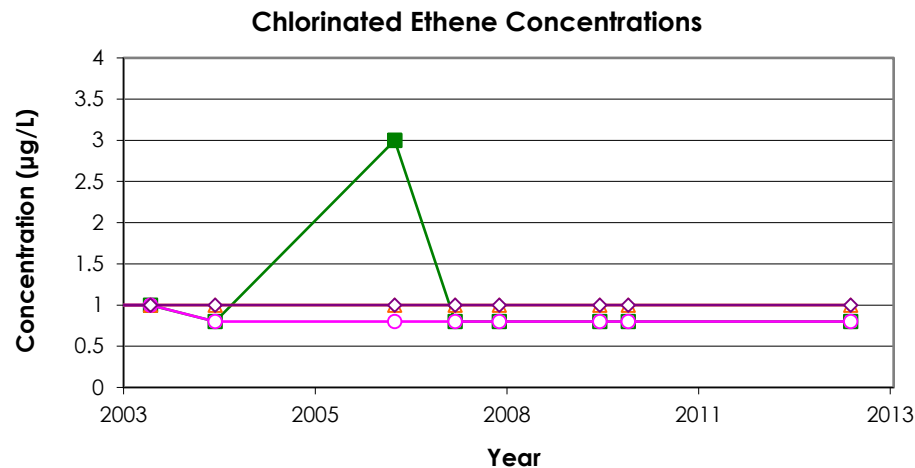


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-2 Atlantic Research Corporation, Gainesville, Virginia

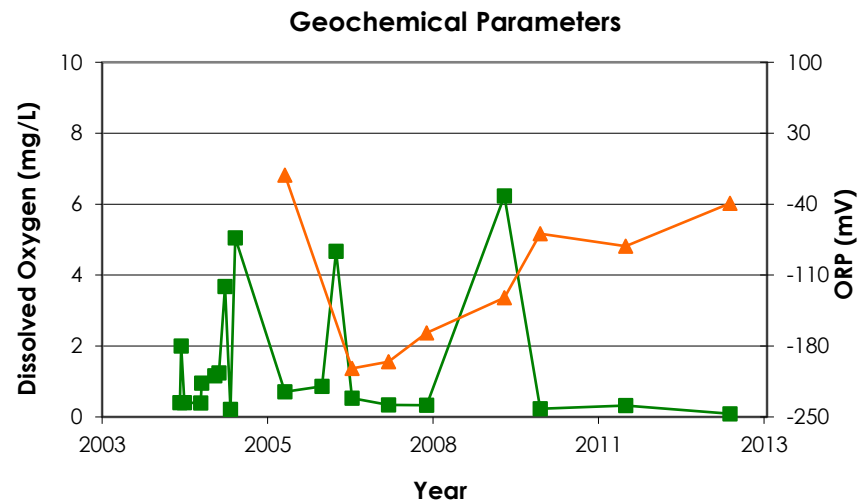
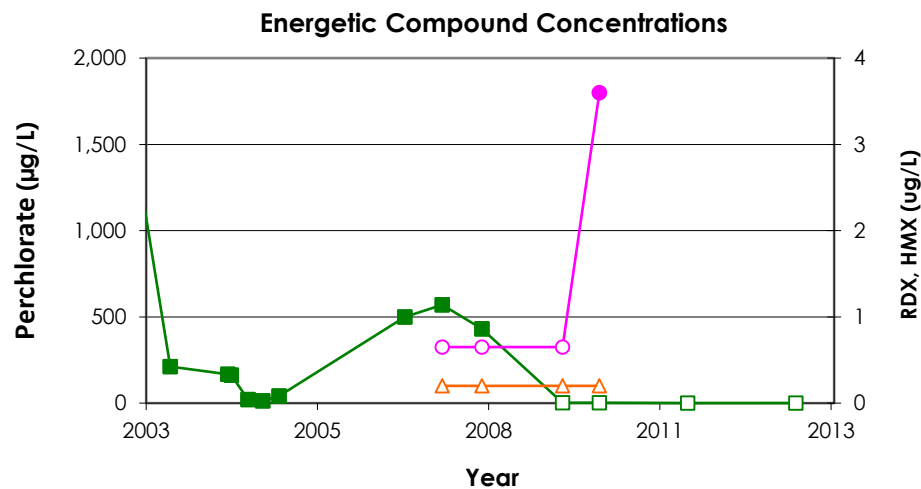
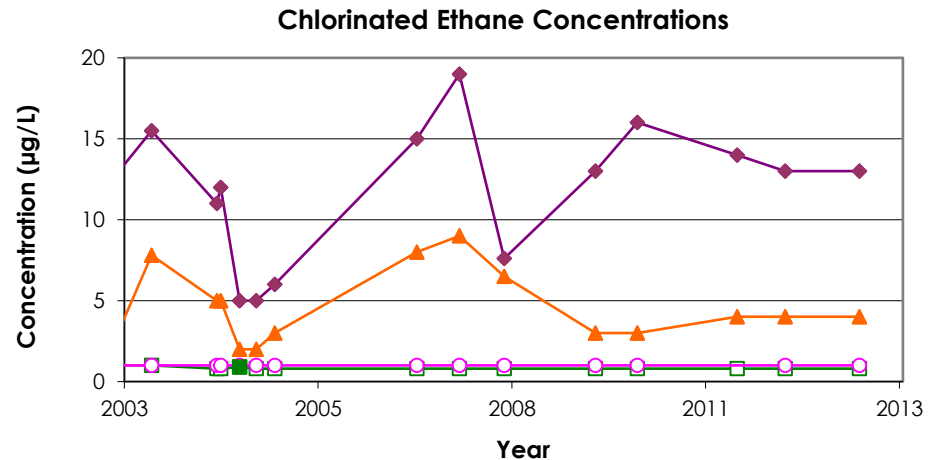
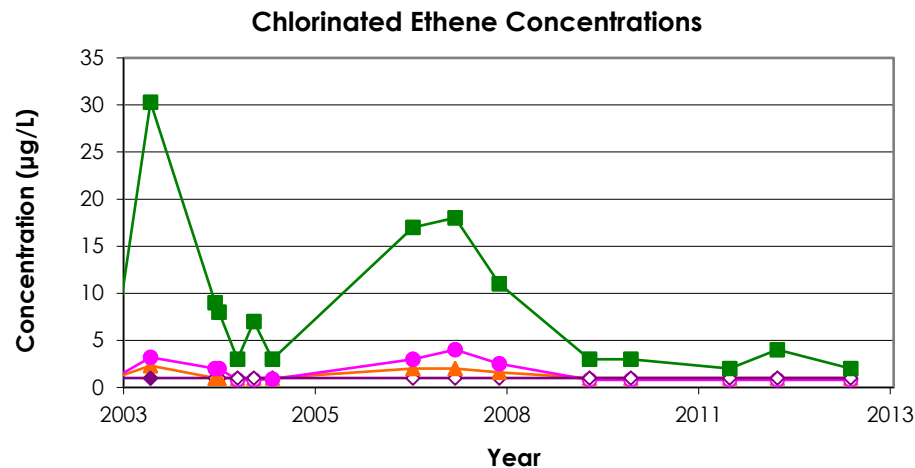


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-20

Atlantic Research Corporation, Gainesville, Virginia

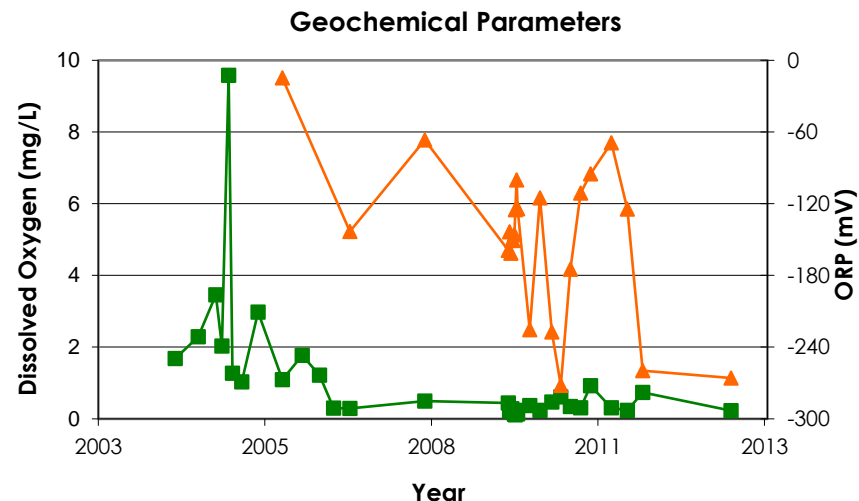
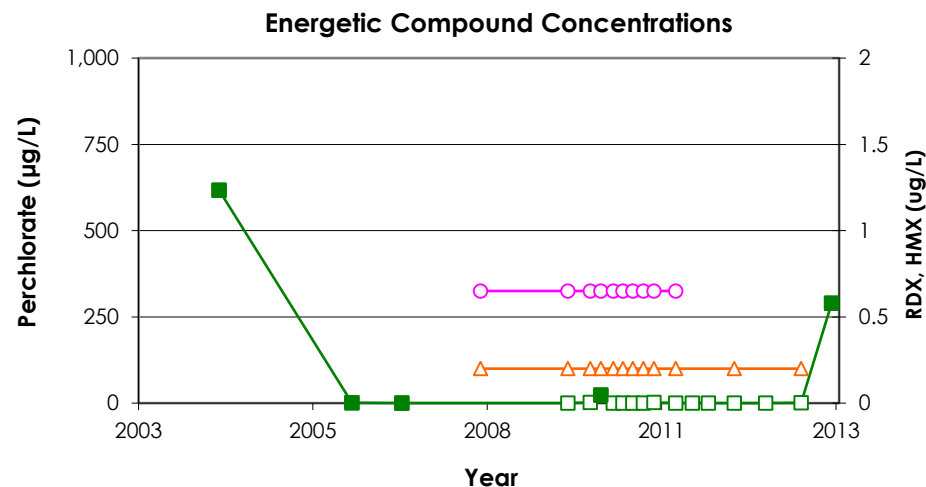
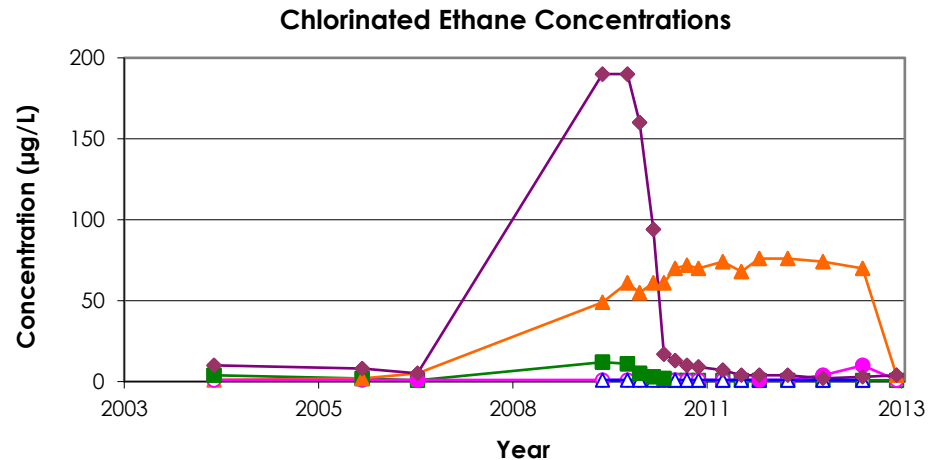
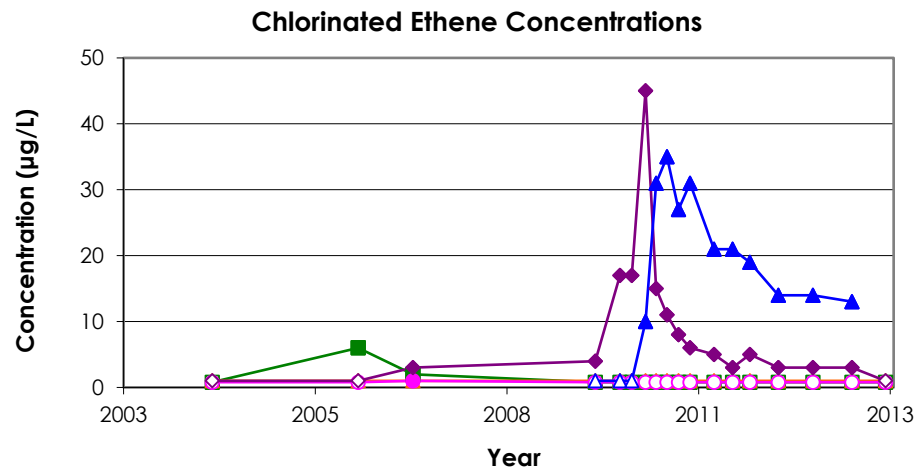


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-22

Atlantic Research Corporation, Gainesville, Virginia

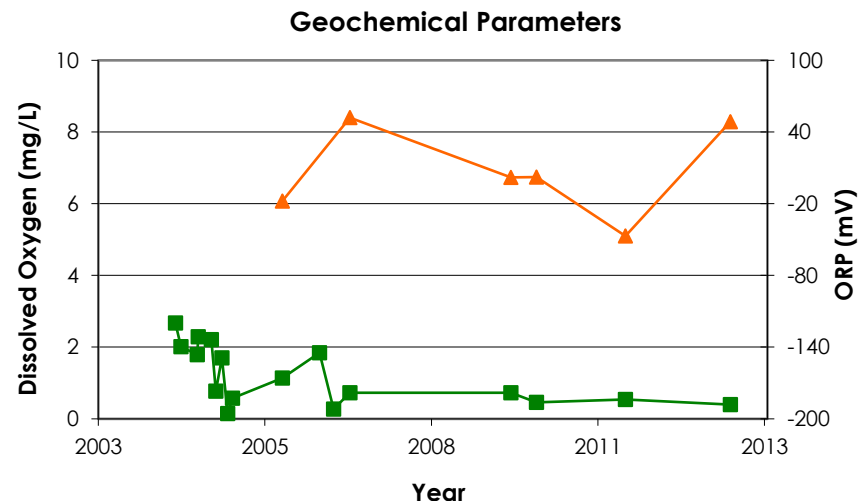
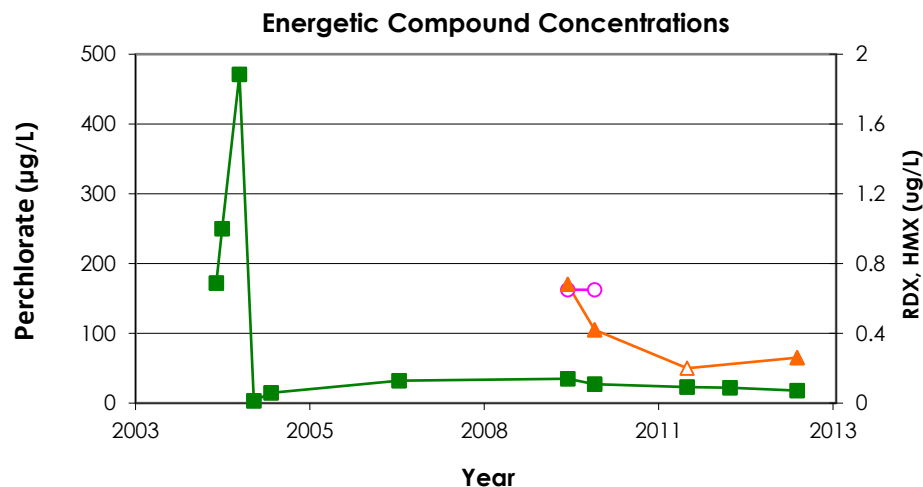
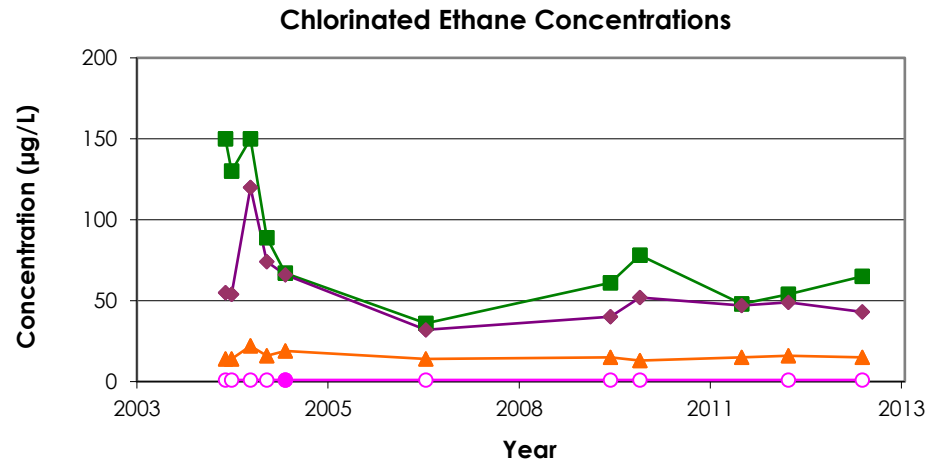
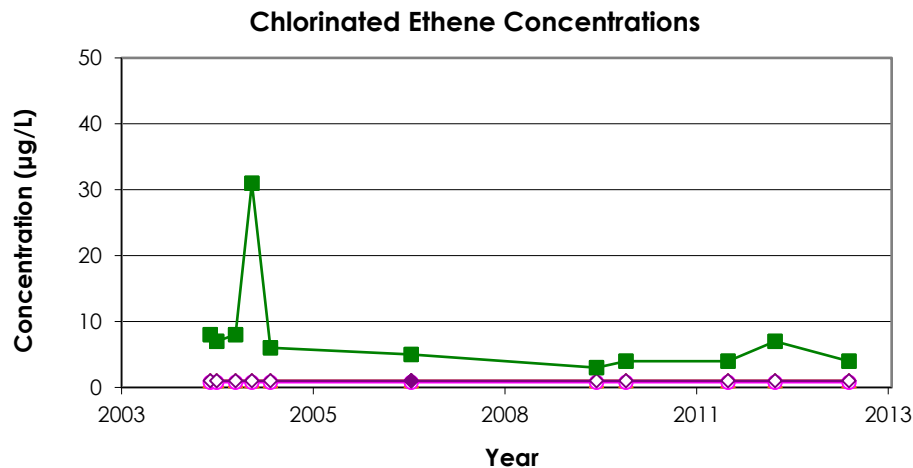


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate ▲ RDX ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-23

Atlantic Research Corporation, Gainesville, Virginia

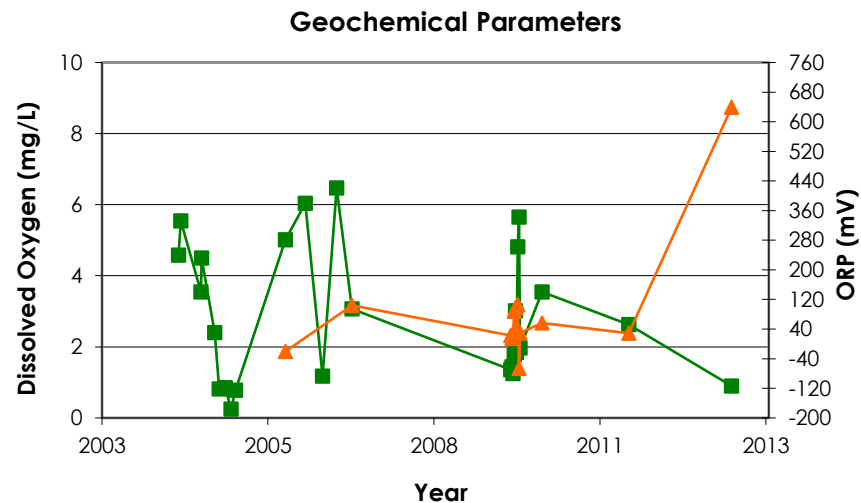
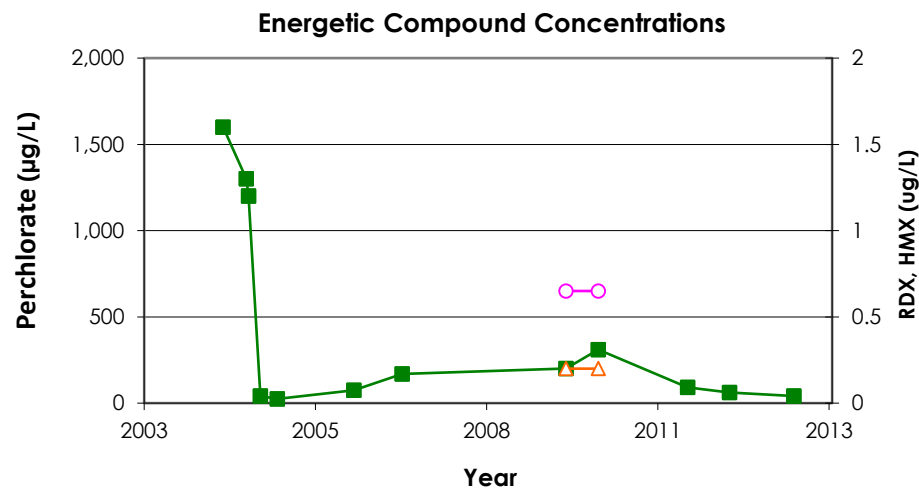
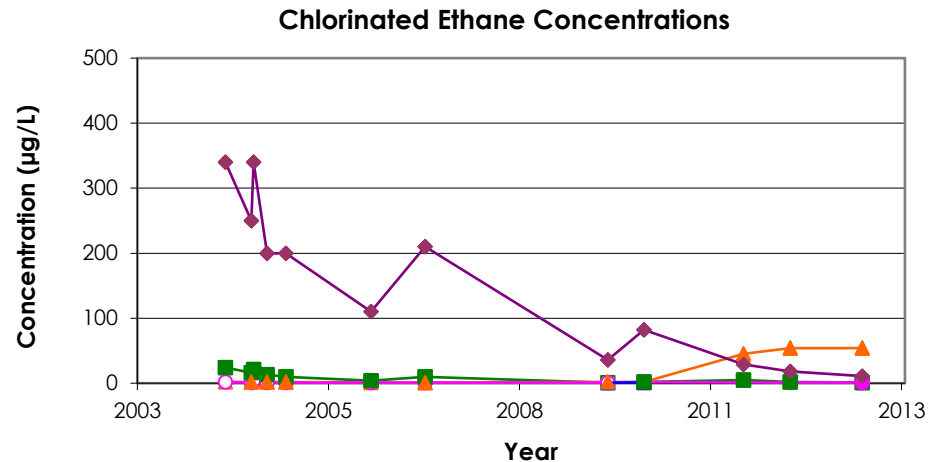
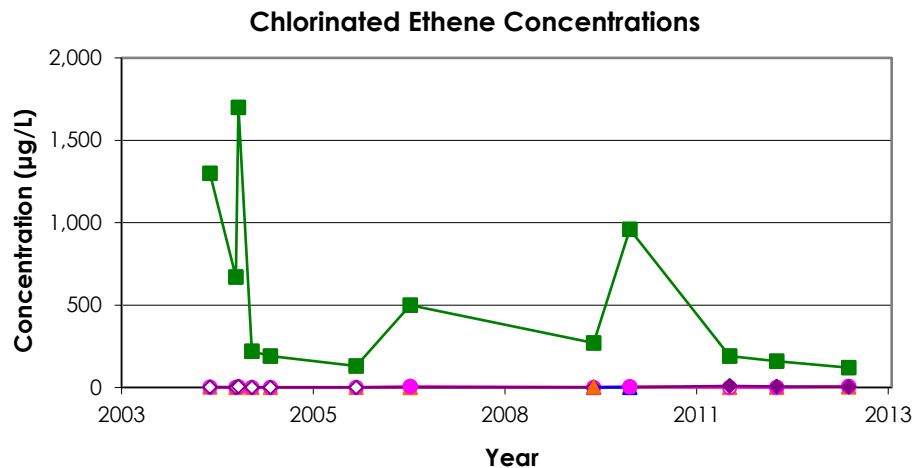


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-24

Atlantic Research Corporation, Gainesville, Virginia

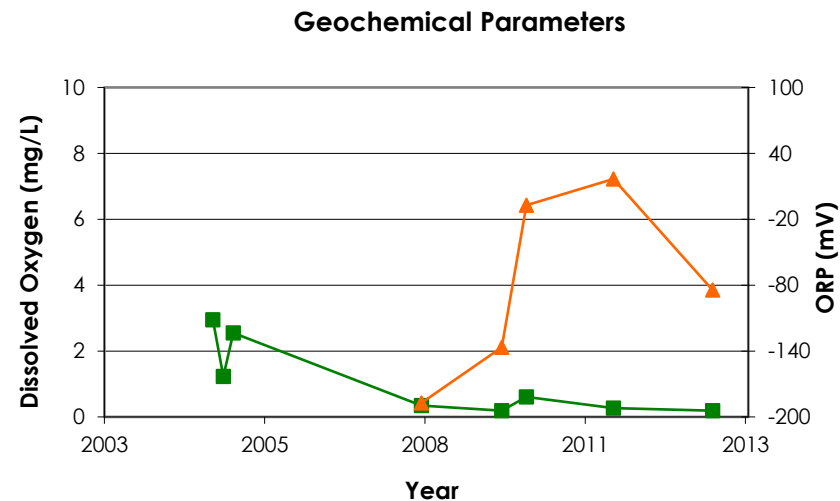
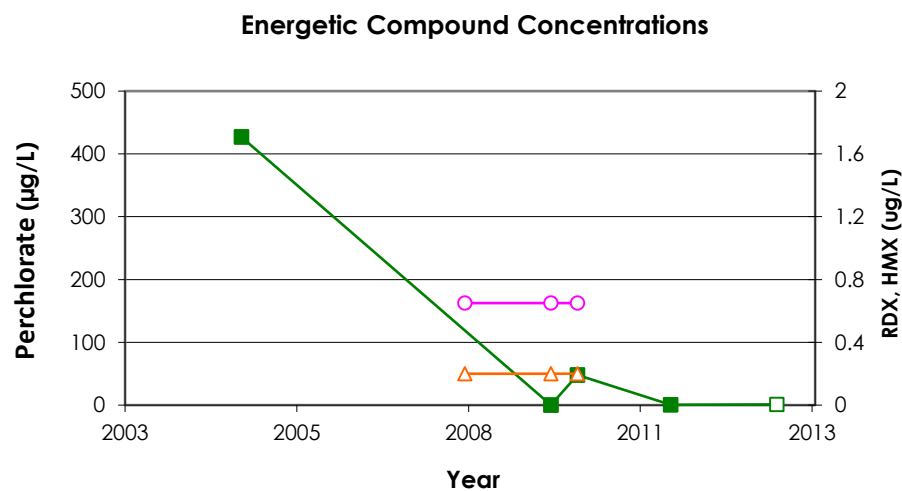
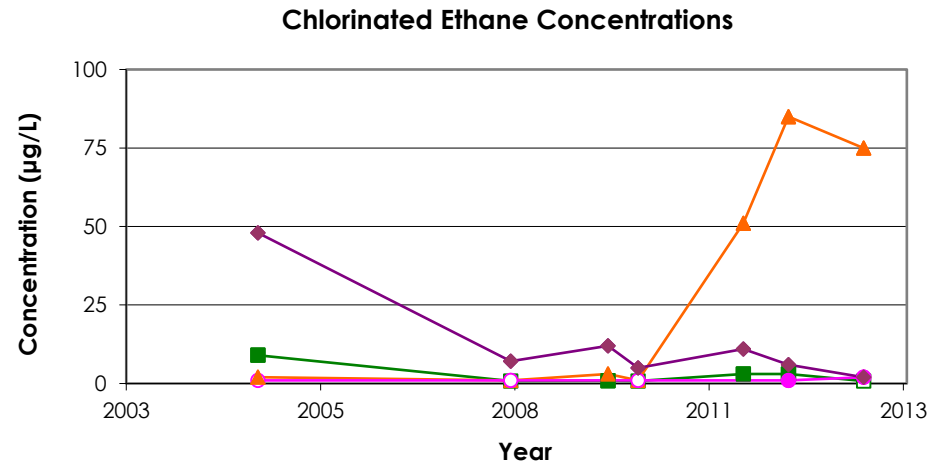
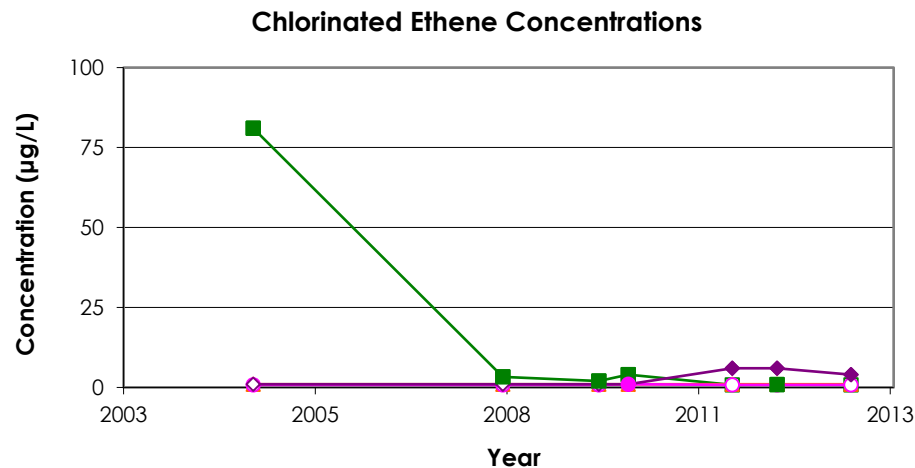


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-25

Atlantic Research Corporation, Gainesville, Virginia

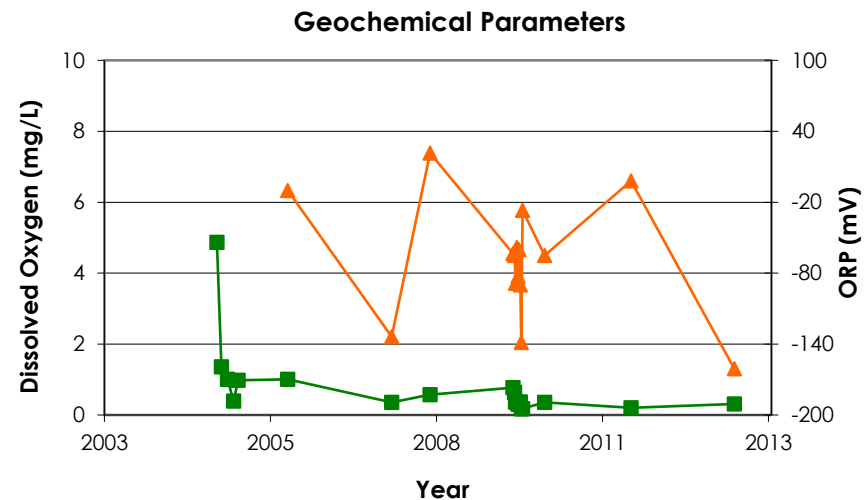
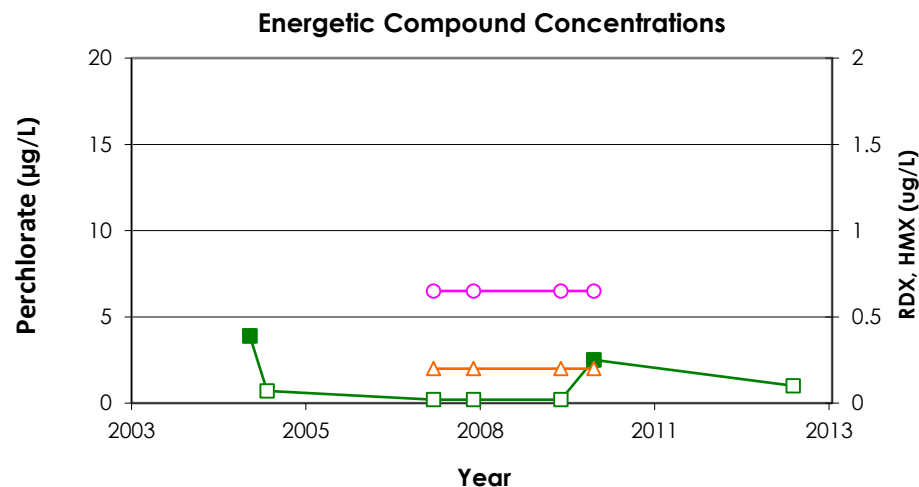
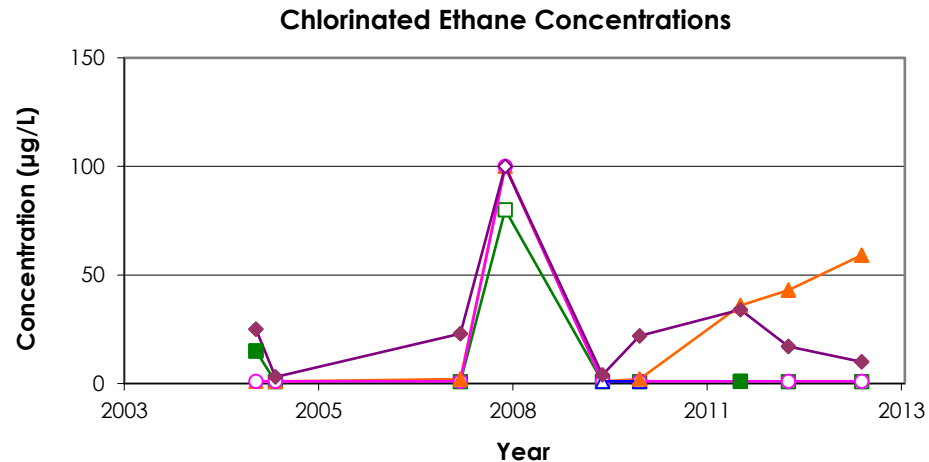
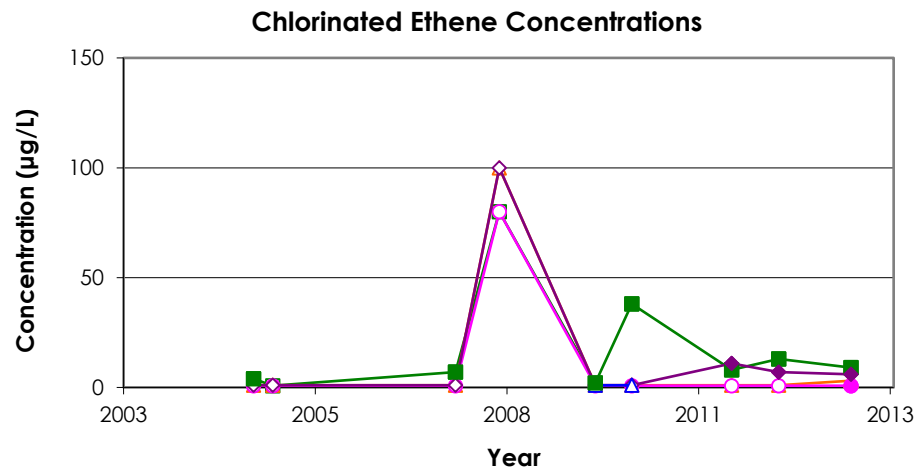


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Figure  
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\\vncinmali-fp1\company\Data\VFH\G7\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 02\_Deep Time Trend Plots-2014011



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-26D

Atlantic Research Corporation, Gainesville, Virginia

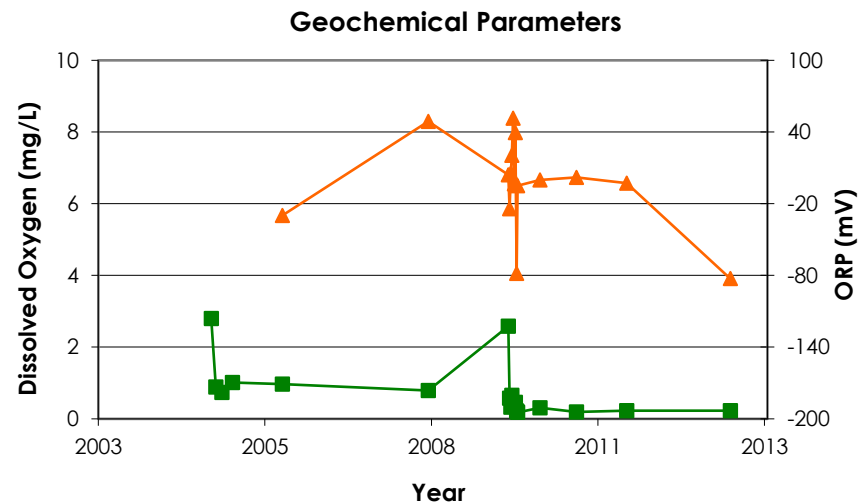
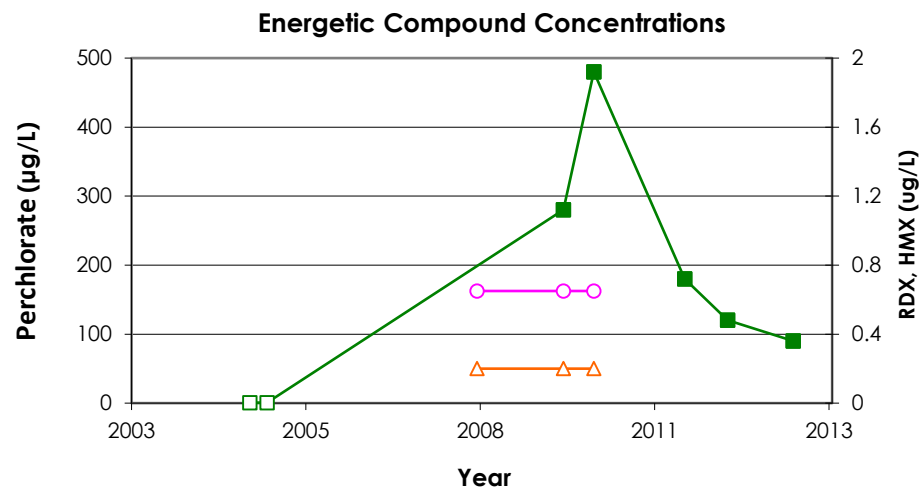
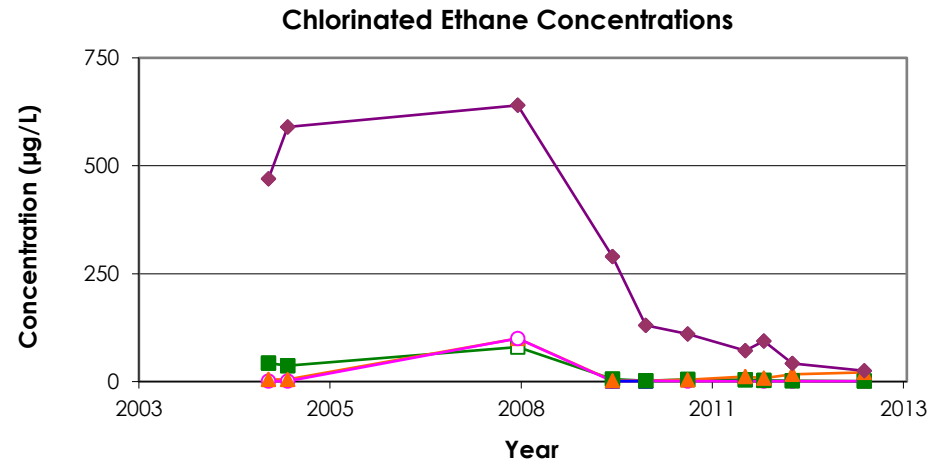
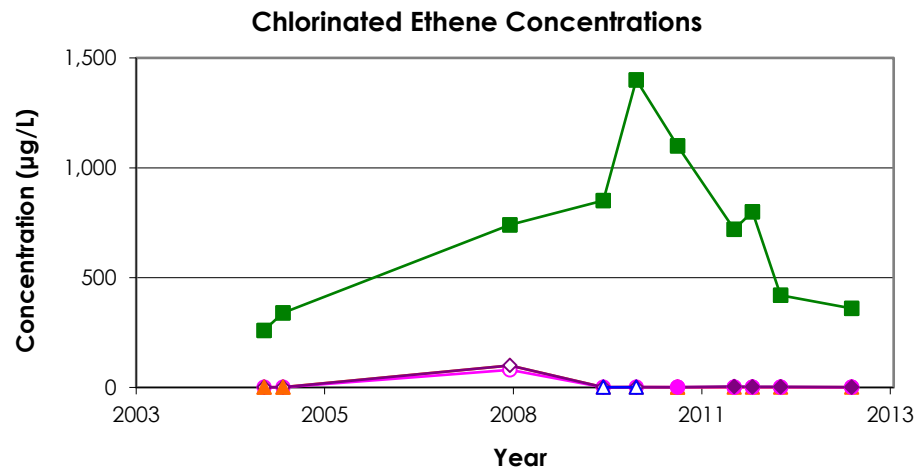


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Figure  
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\\vncinmali-fp1\company\Date\VFH\G7\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 02\_Deep Time Trend Plots-2014011



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-261

Atlantic Research Corporation, Gainesville, Virginia

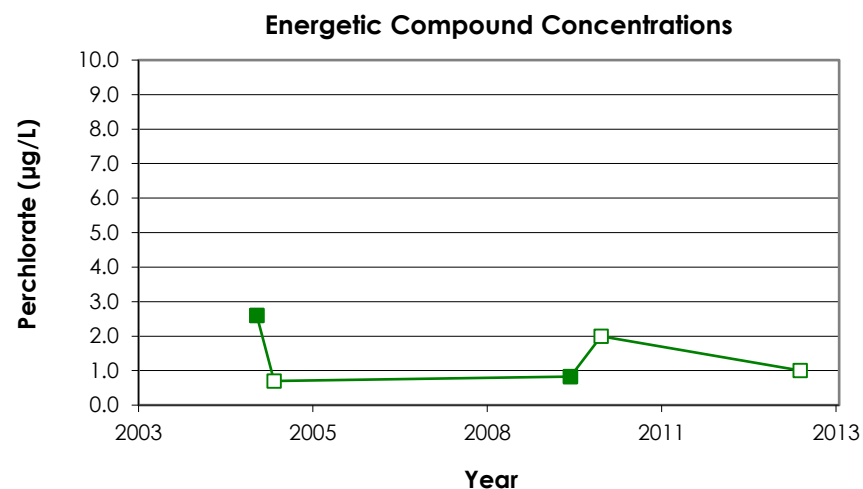
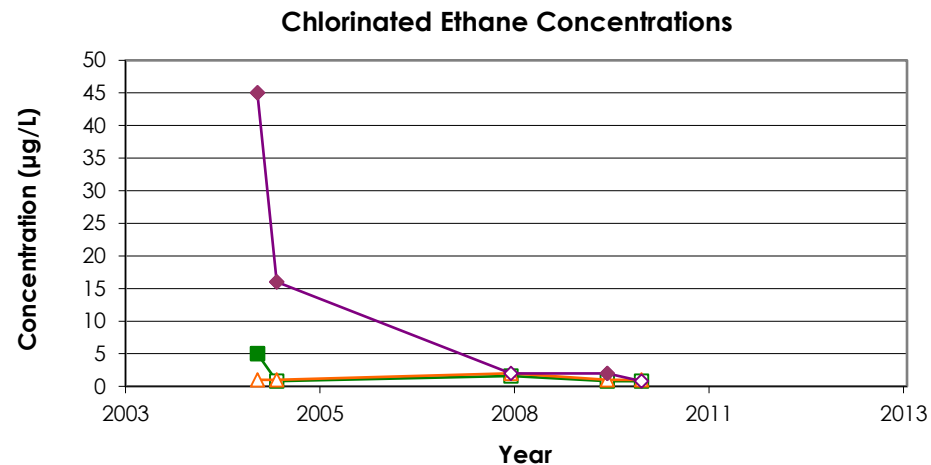
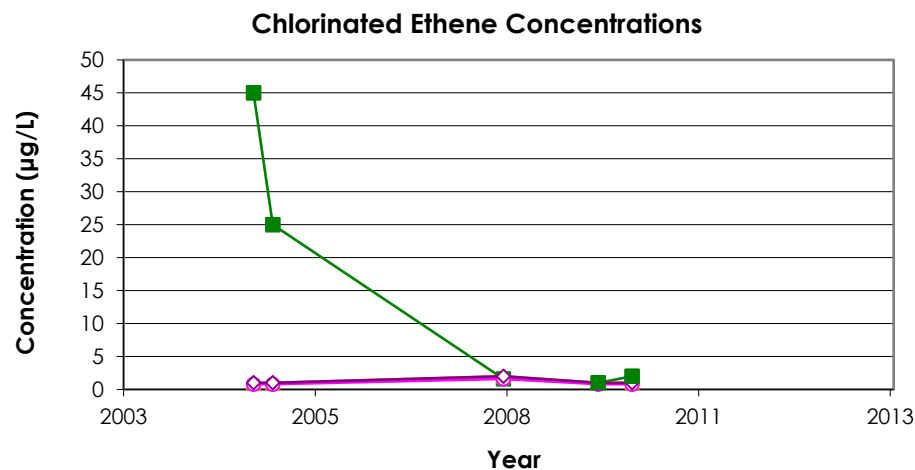


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-26S Atlantic Research Corporation, Gainesville, Virginia

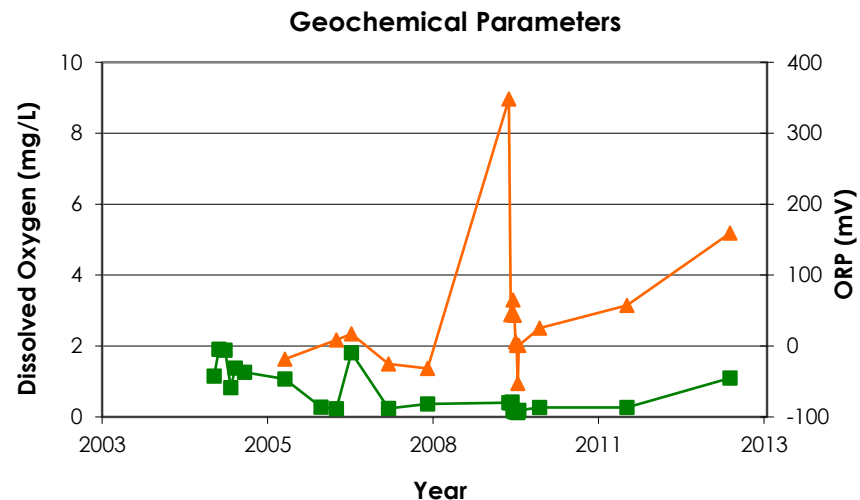
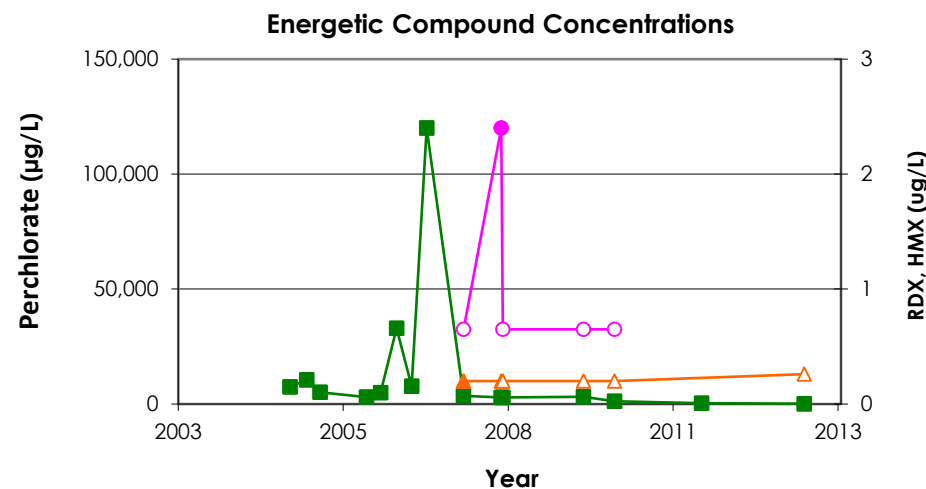
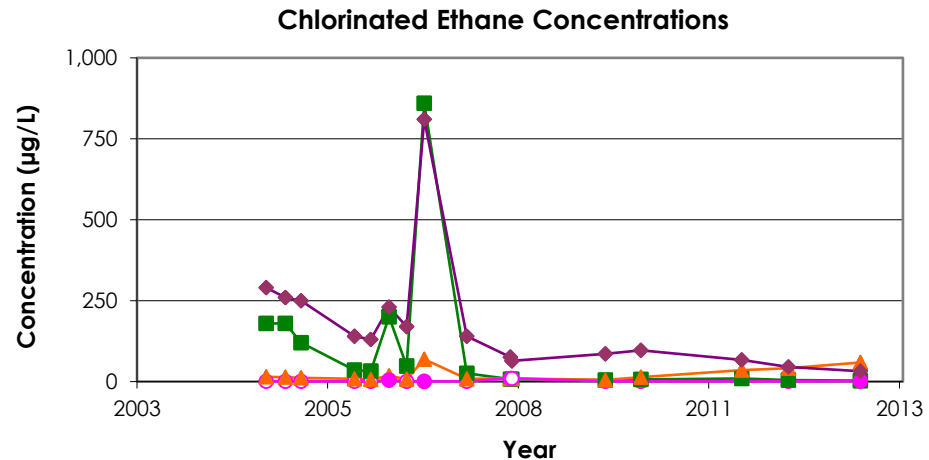
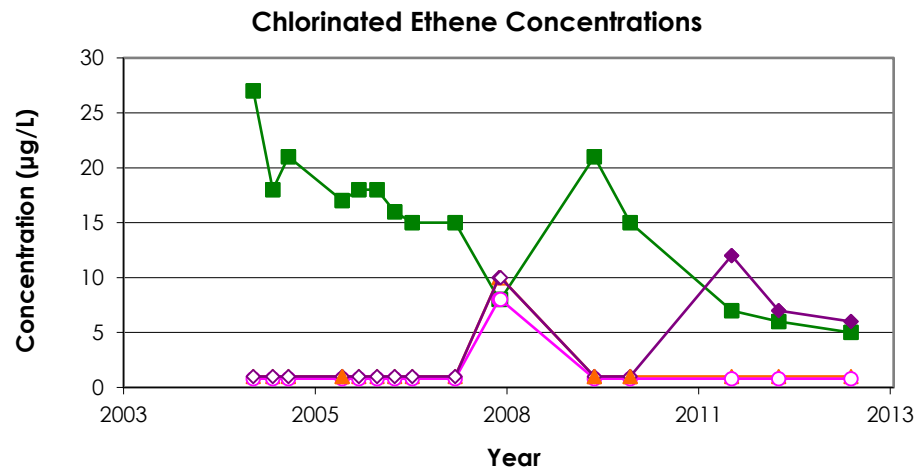


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-28D

Atlantic Research Corporation, Gainesville, Virginia

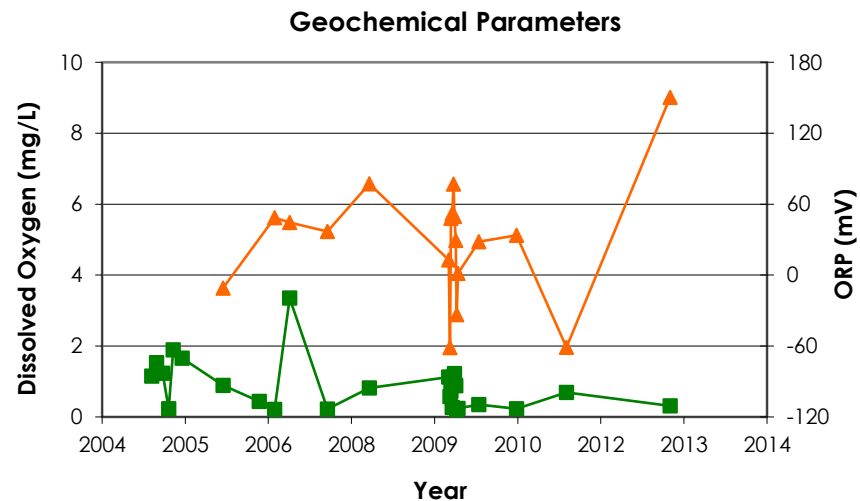
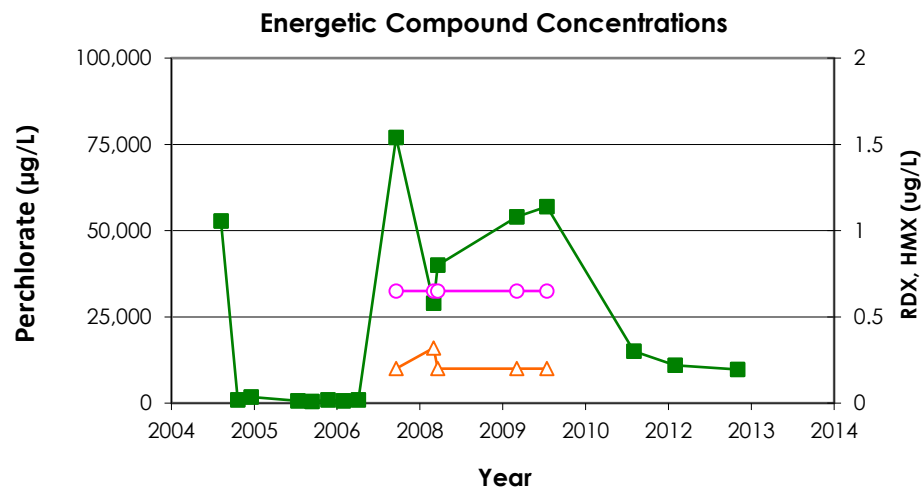
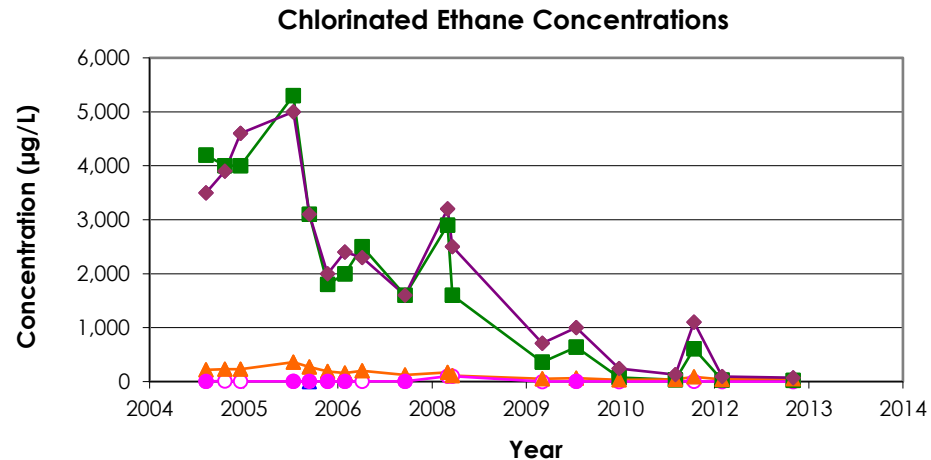
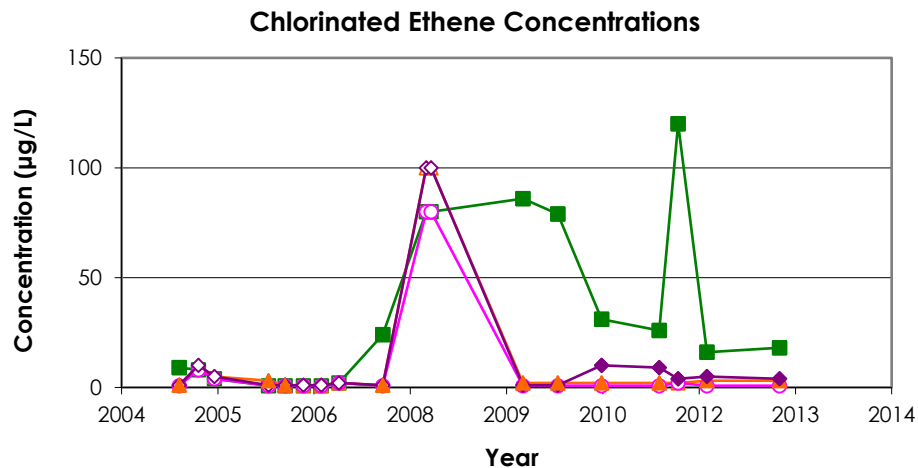


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-281

Atlantic Research Corporation, Gainesville, Virginia

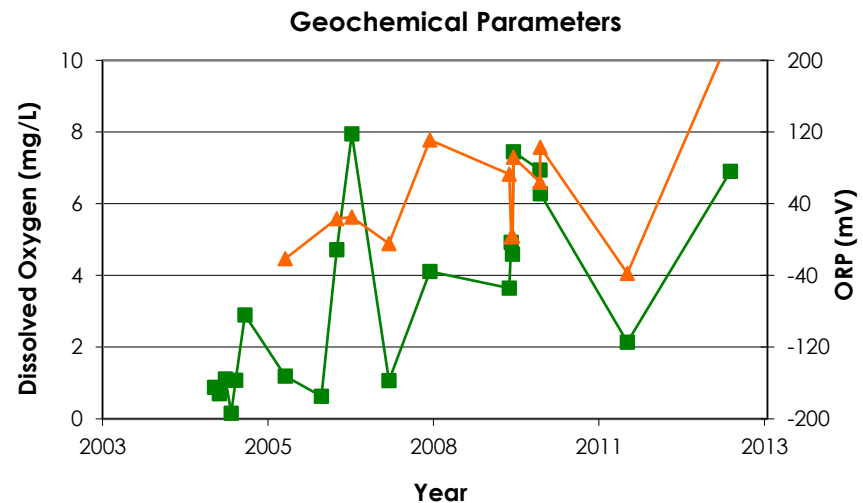
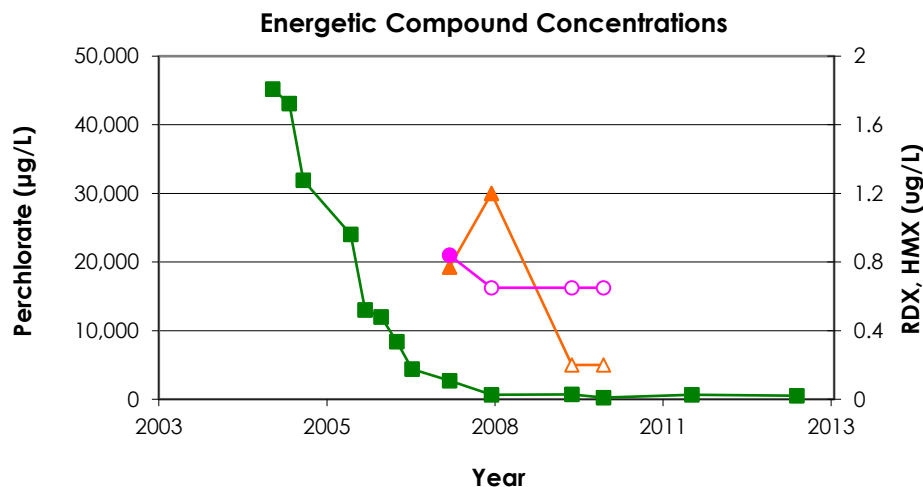
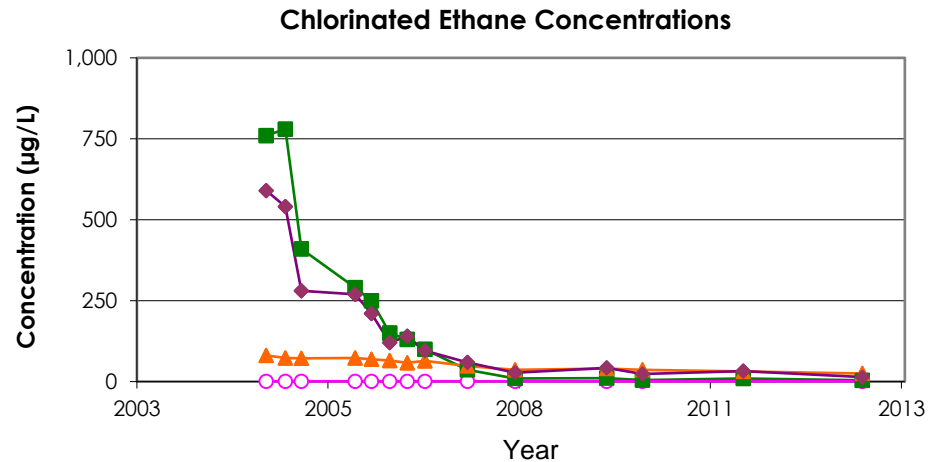
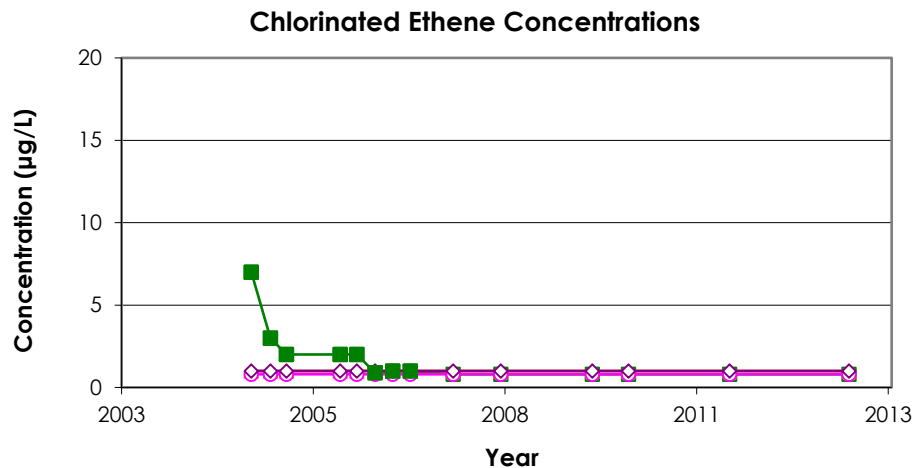


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-28S

Atlantic Research Corporation, Gainesville, Virginia

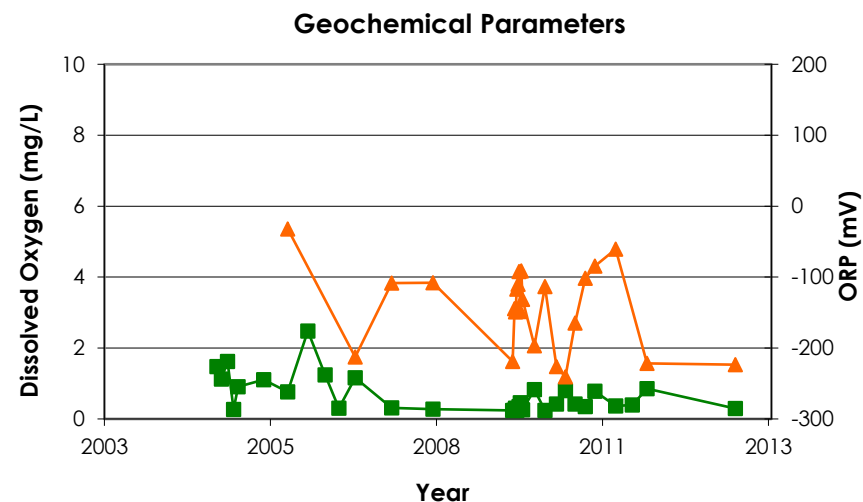
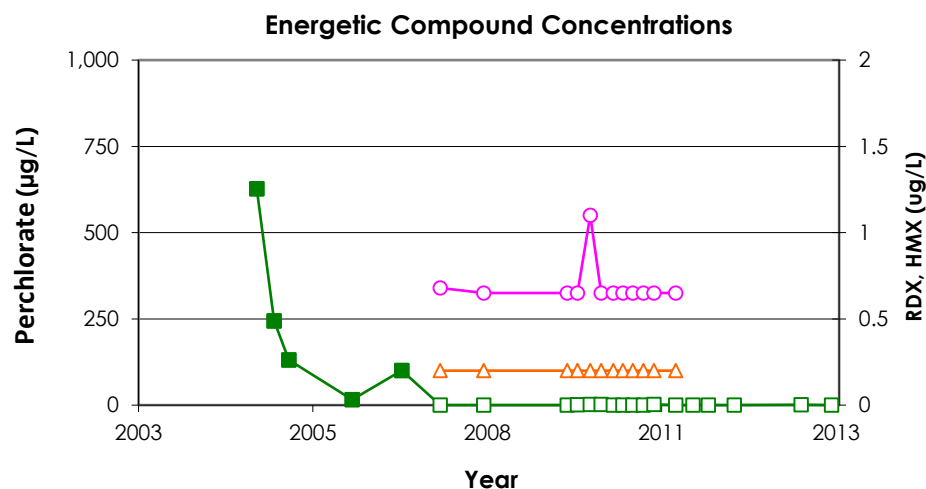
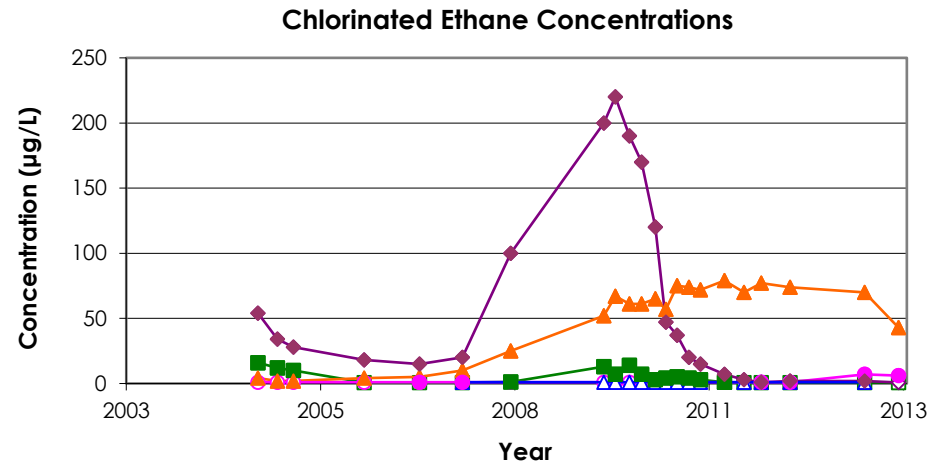
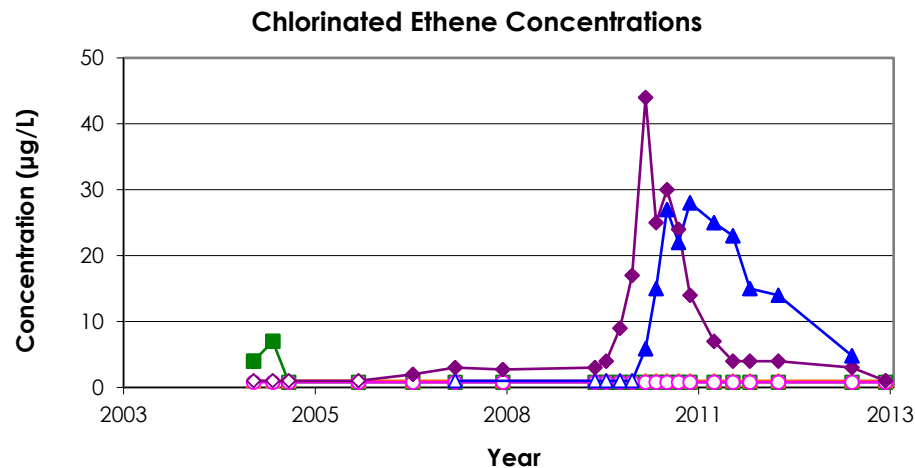


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-29D

Atlantic Research Corporation, Gainesville, Virginia

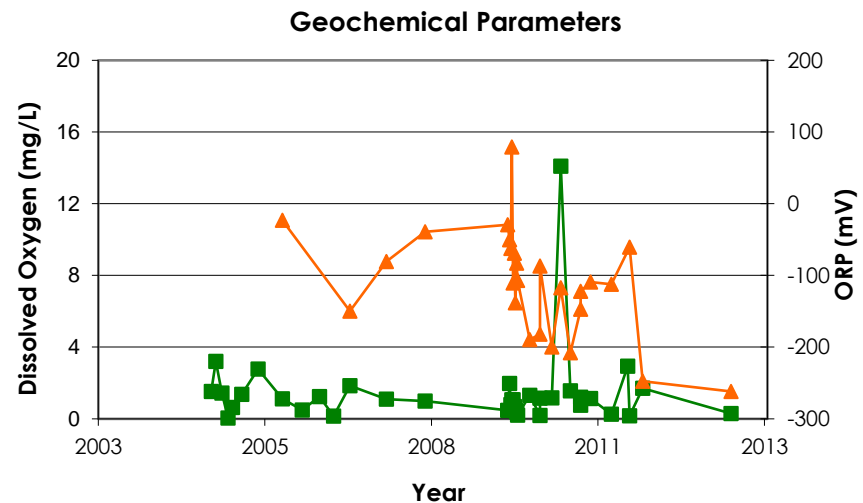
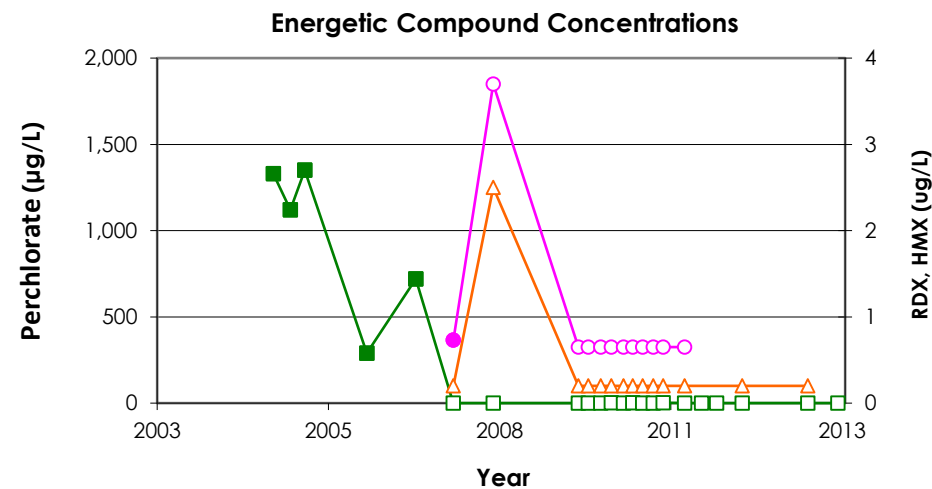
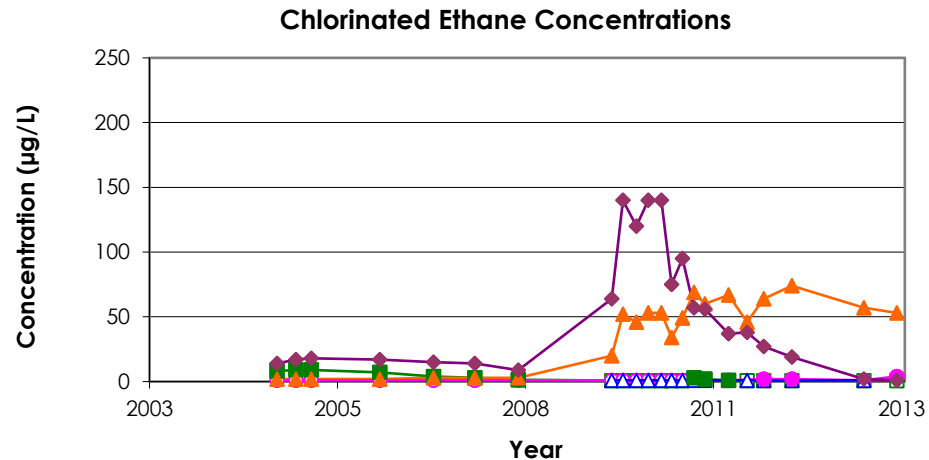
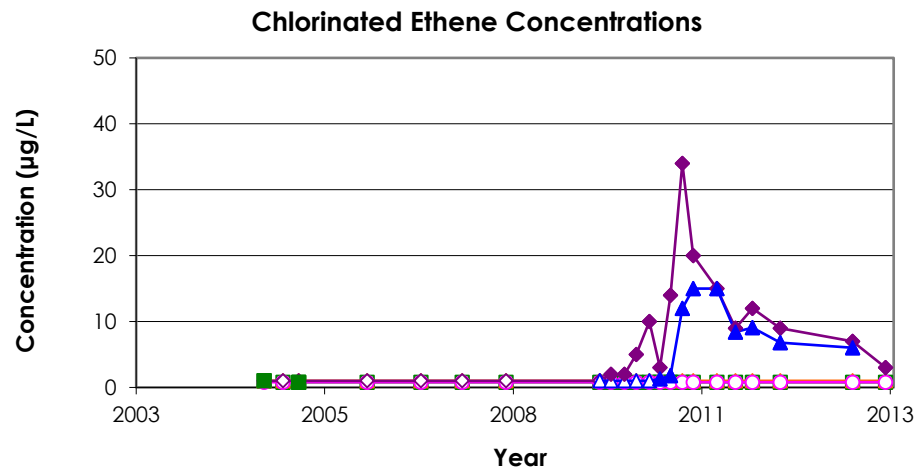


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

Perchlorate ▲ RDX ● HMX

#### Geochemical

- Dissolved Oxygen
- Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-291

Atlantic Research Corporation, Gainesville, Virginia

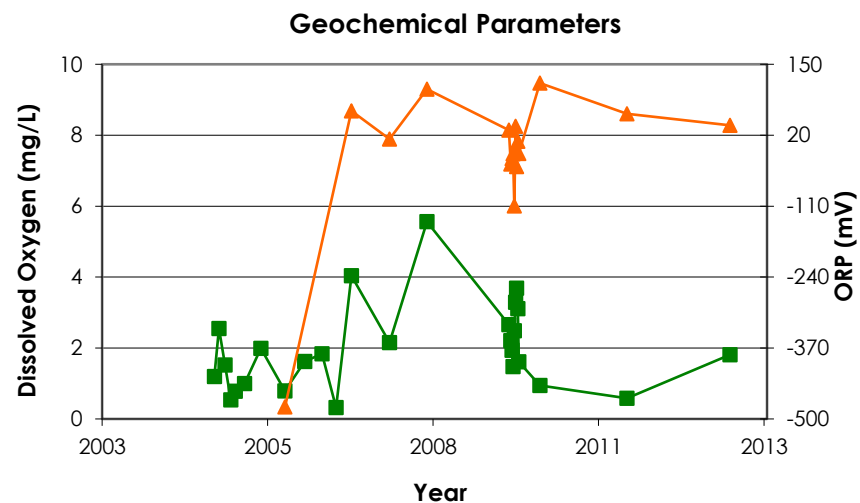
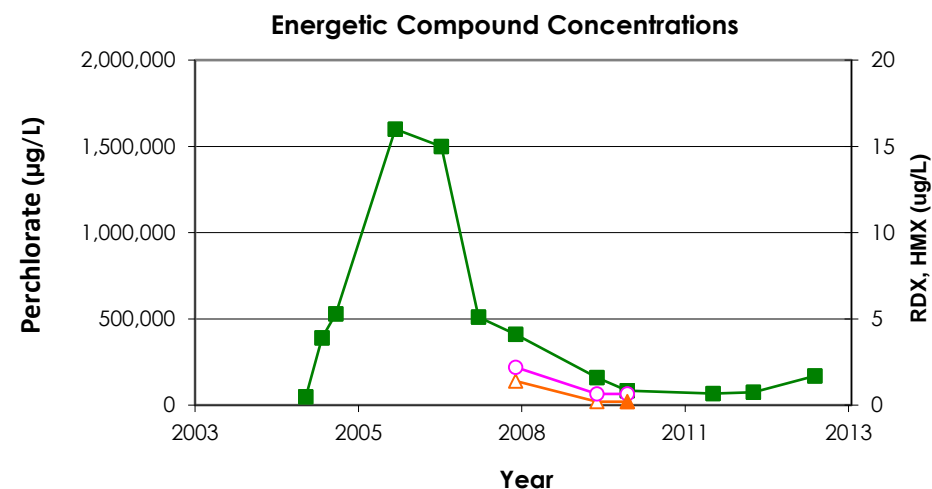
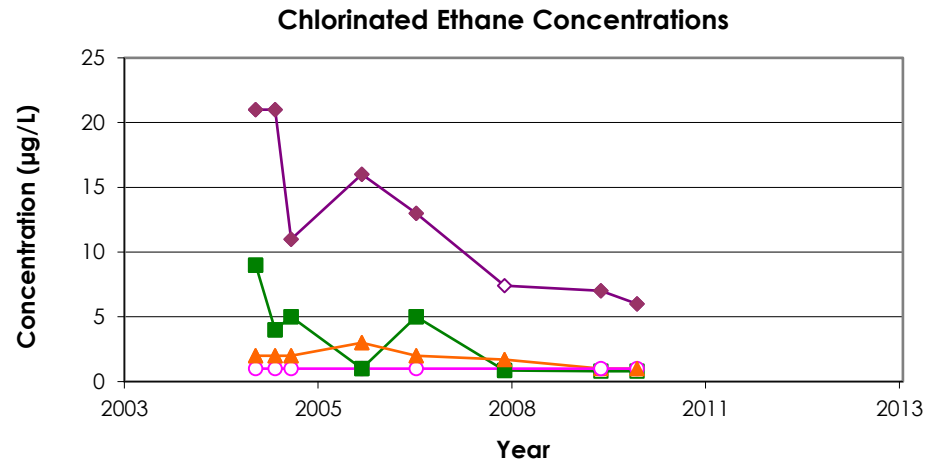
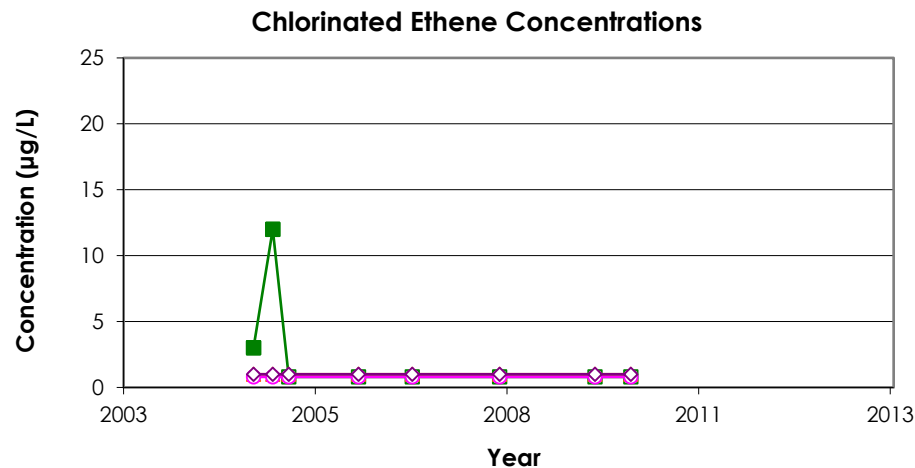


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-29S

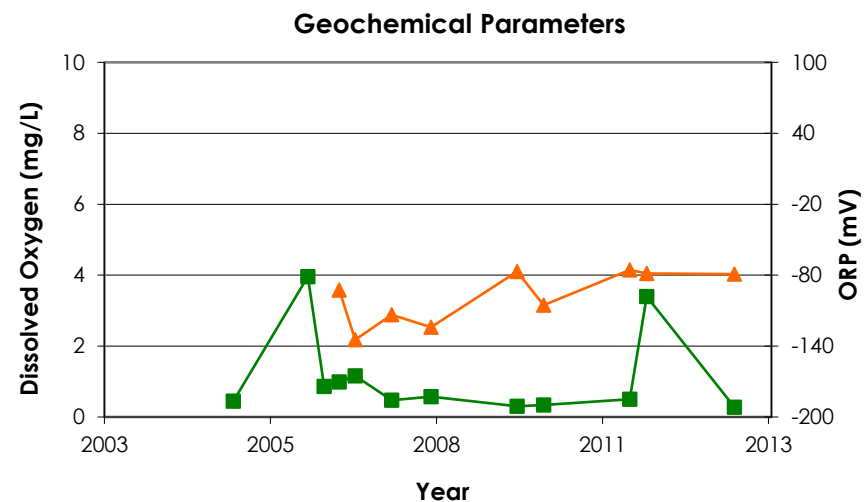
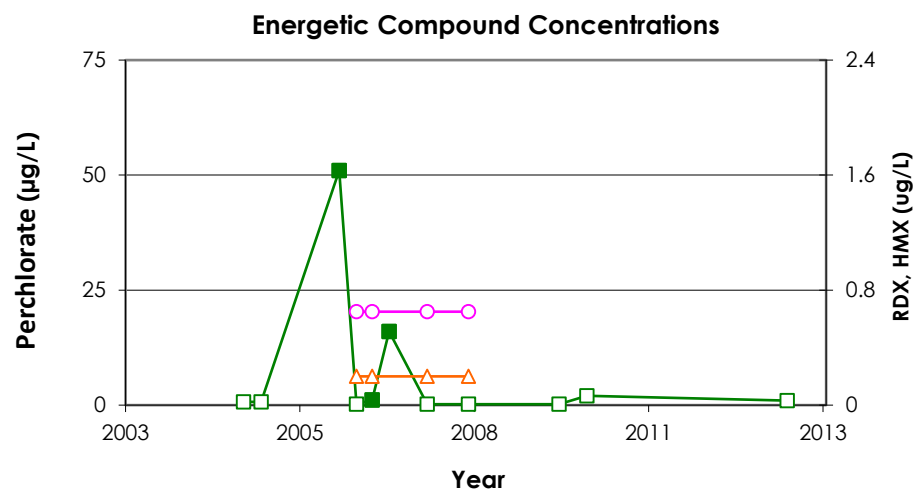
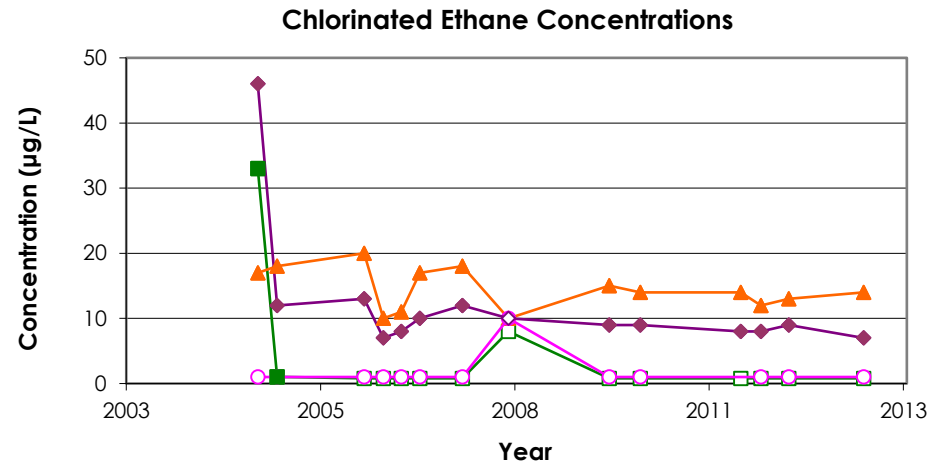
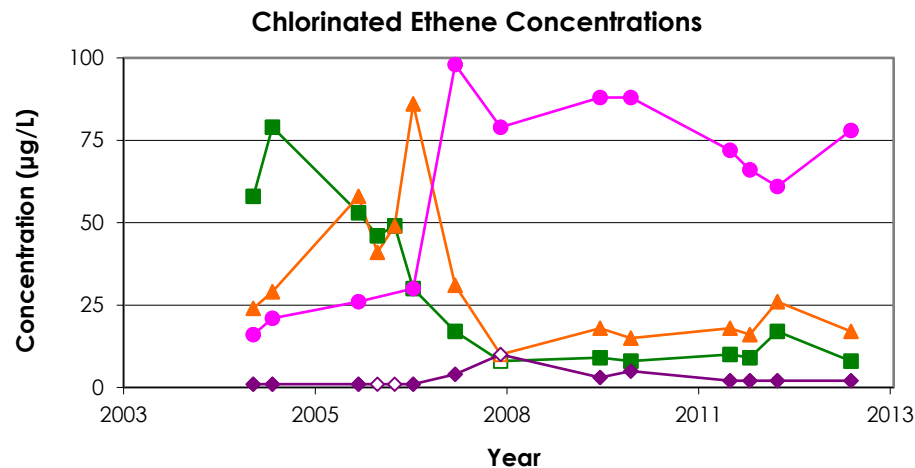
Atlantic Research Corporation, Gainesville, Virginia



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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-3

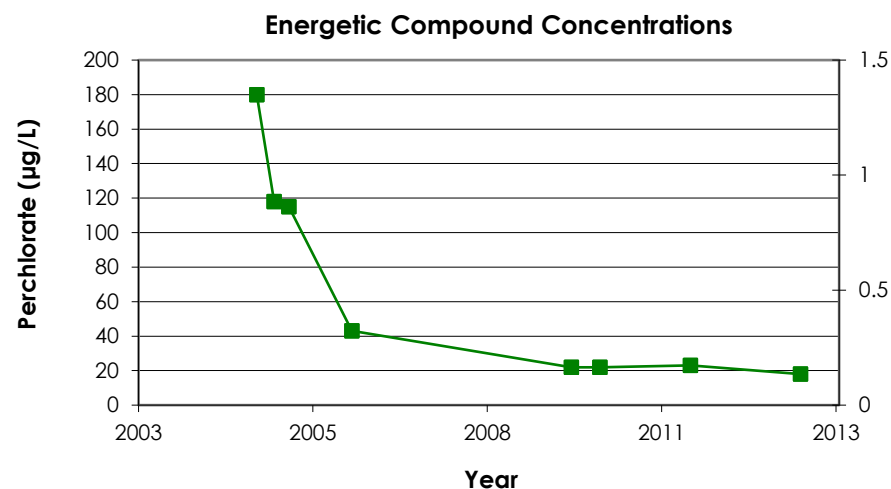
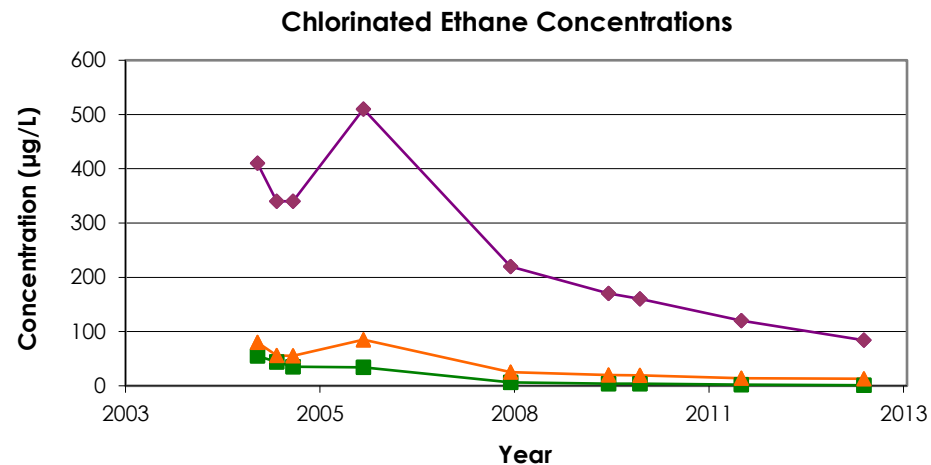
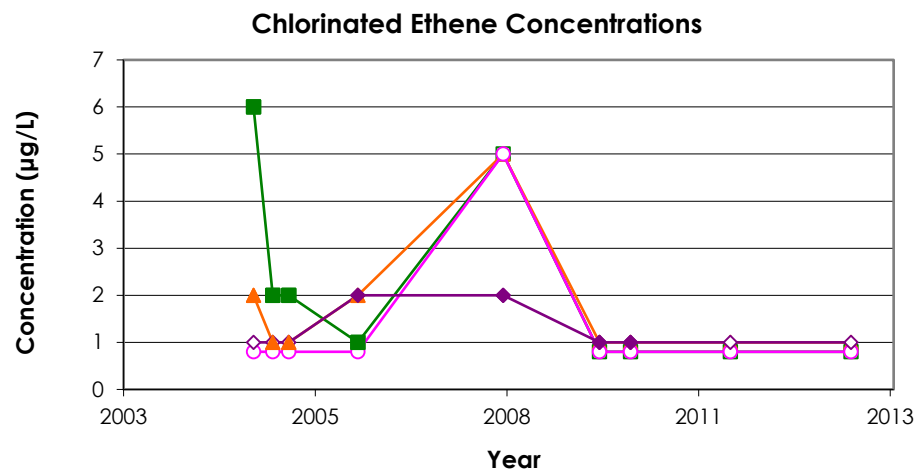
Atlantic Research Corporation, Gainesville, Virginia



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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-30D Atlantic Research Corporation, Gainesville, Virginia

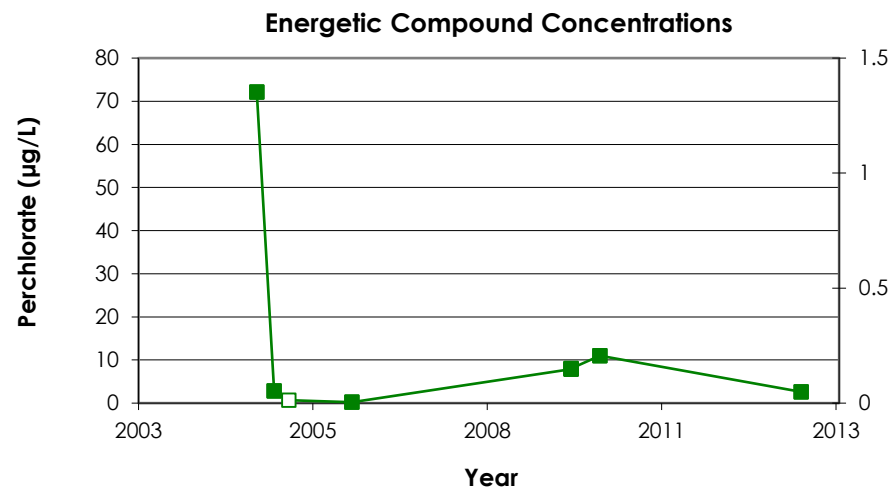
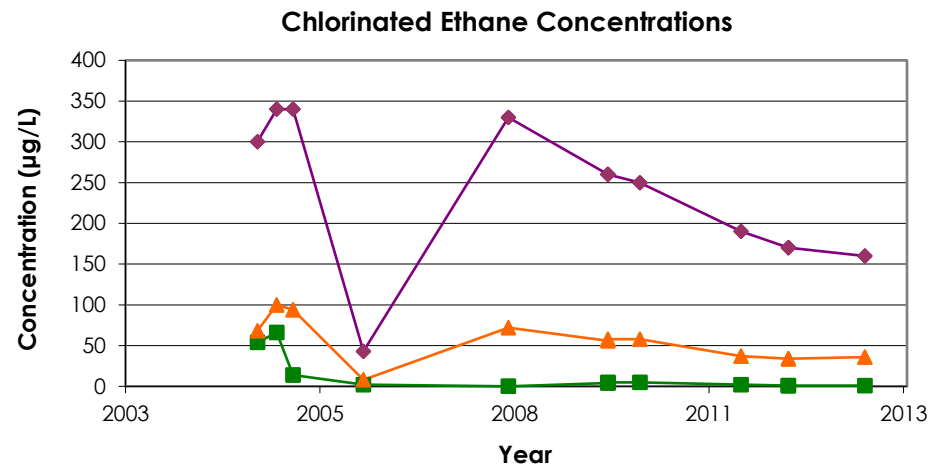
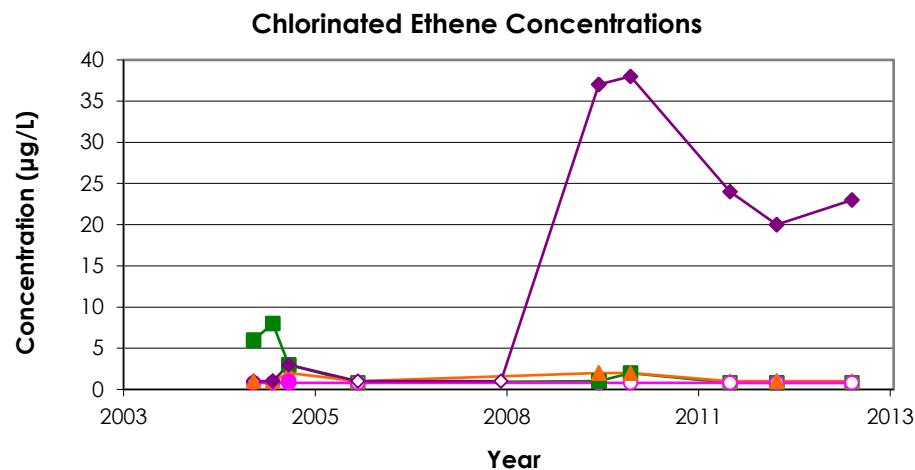


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-301 Atlantic Research Corporation, Gainesville, Virginia

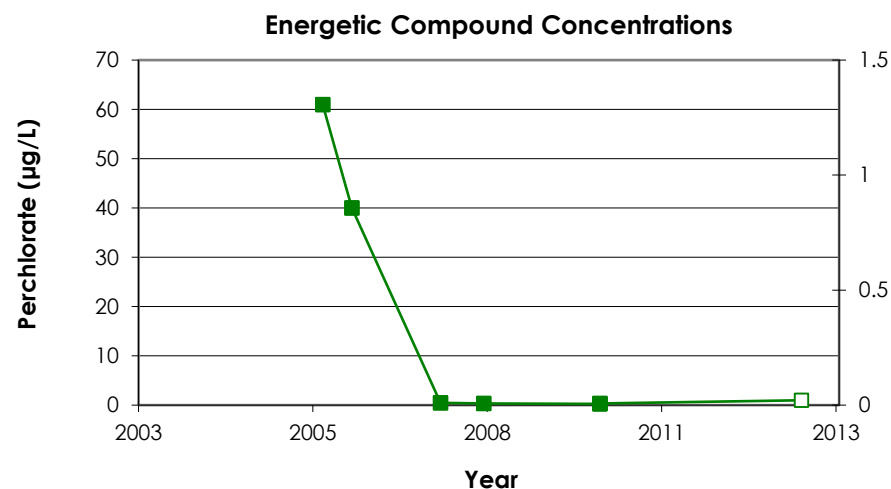
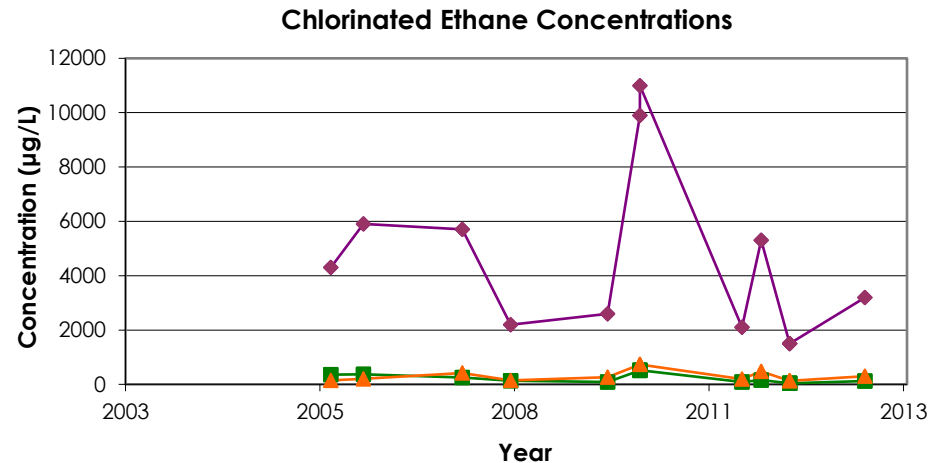
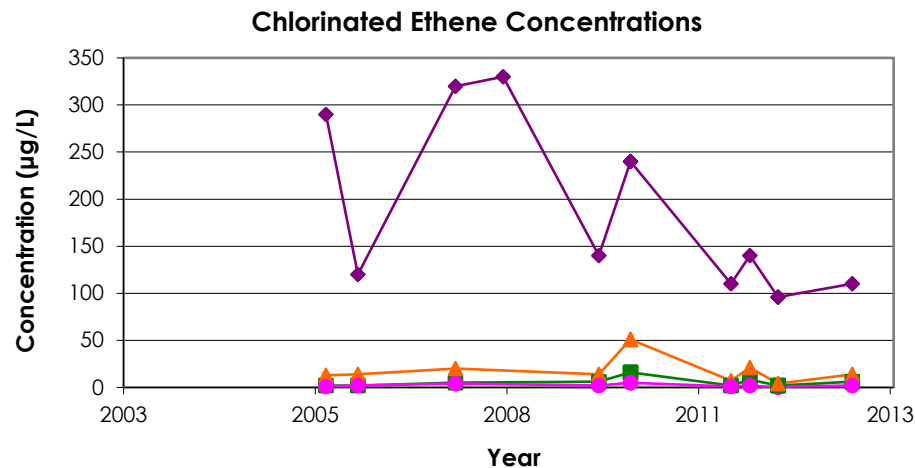


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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-321 Atlantic Research Corporation, Gainesville, Virginia

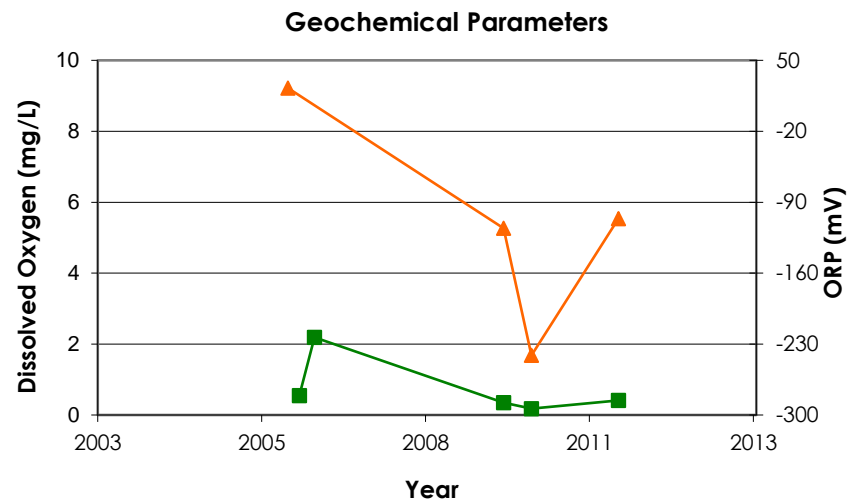
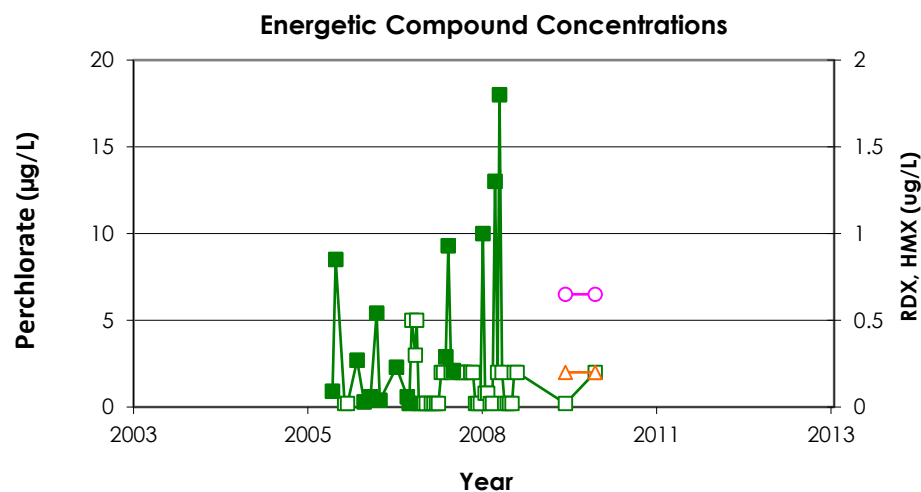
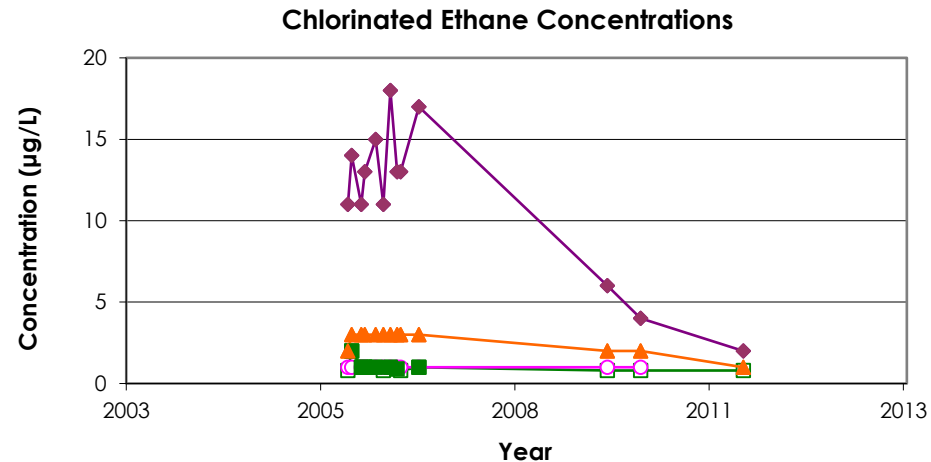
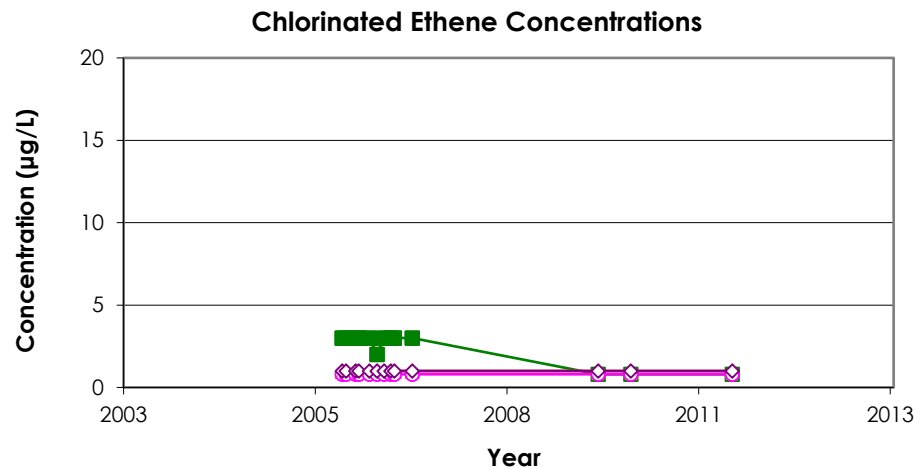


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- ◆ Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-34

Atlantic Research Corporation, Gainesville, Virginia

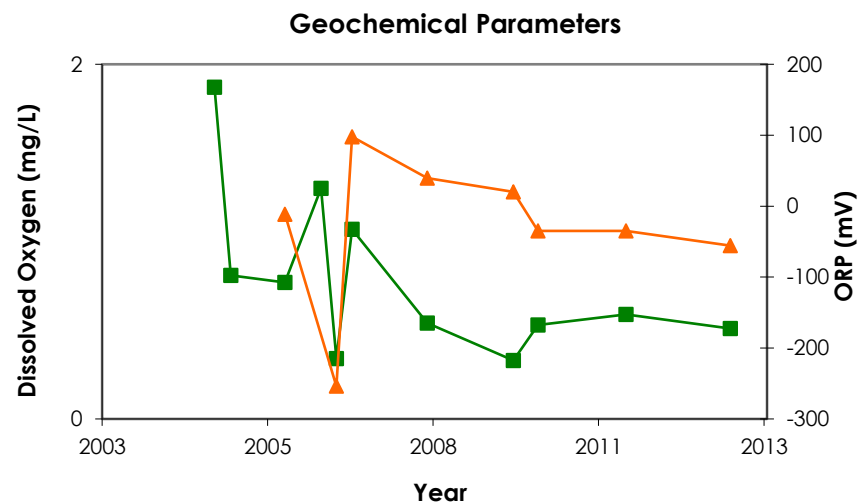
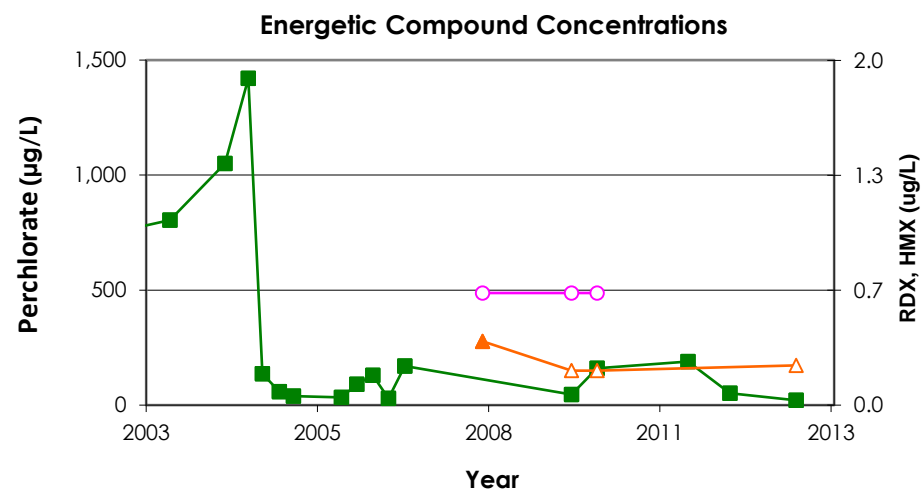
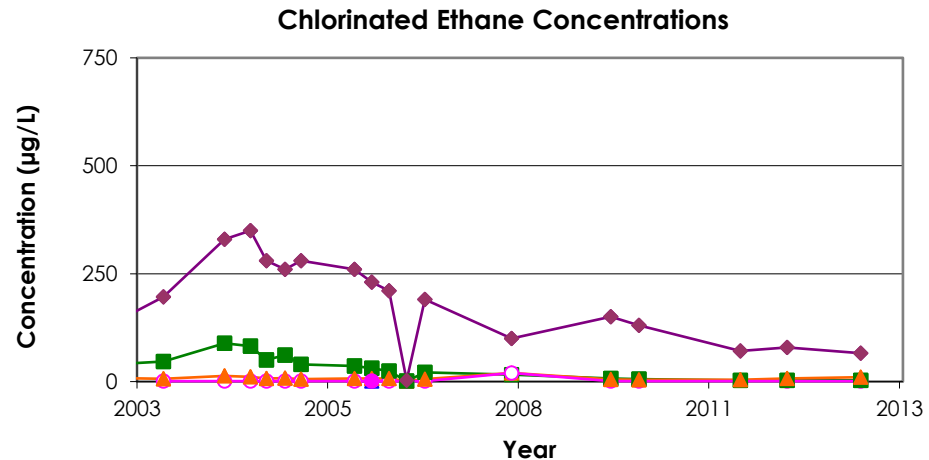
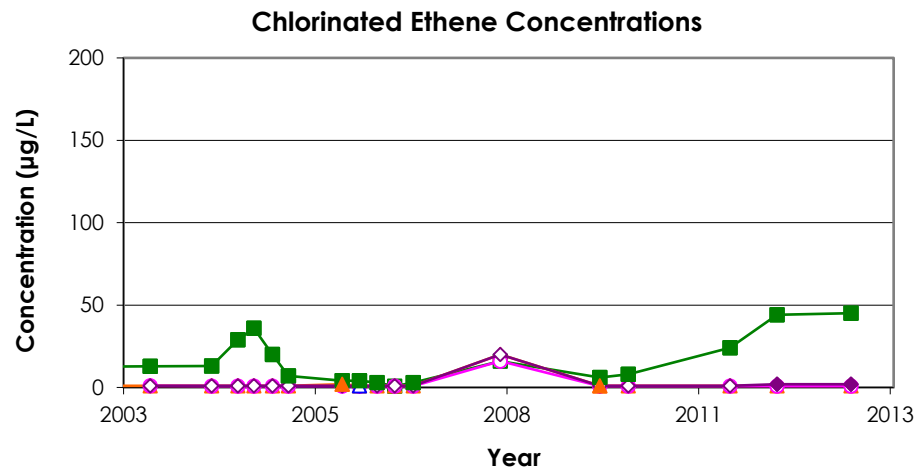


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-72A

Atlantic Research Corporation, Gainesville, Virginia

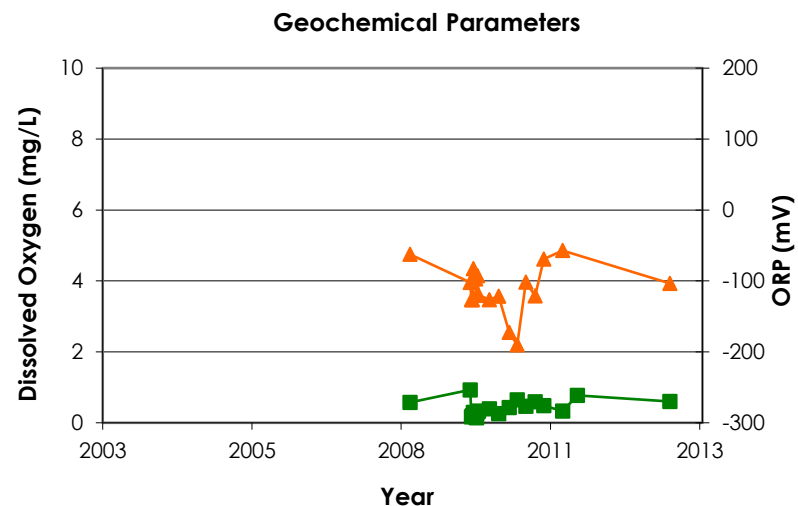
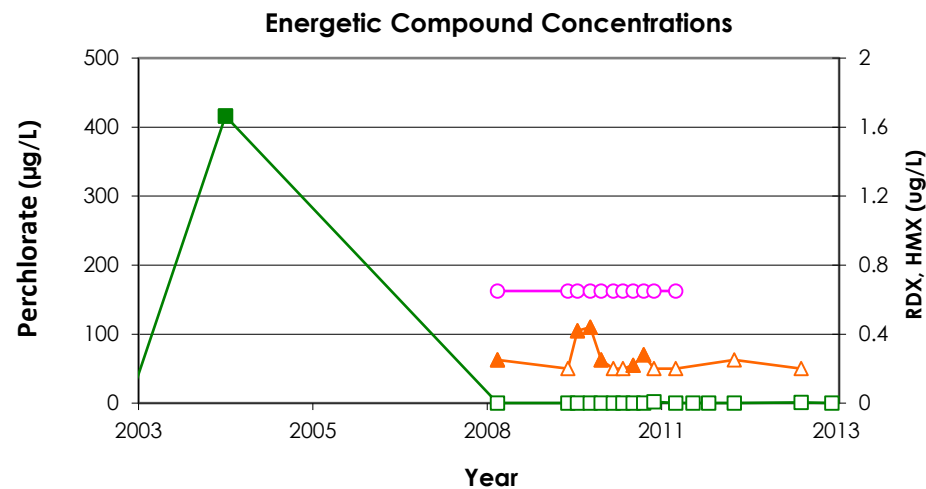
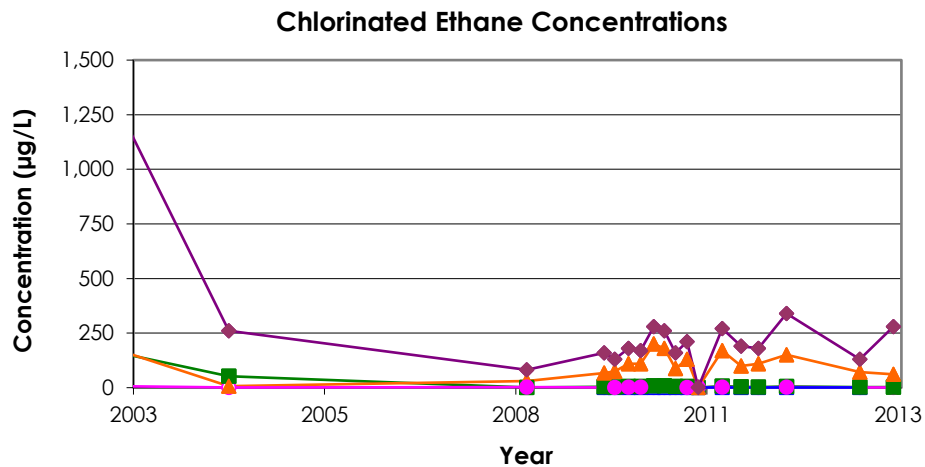
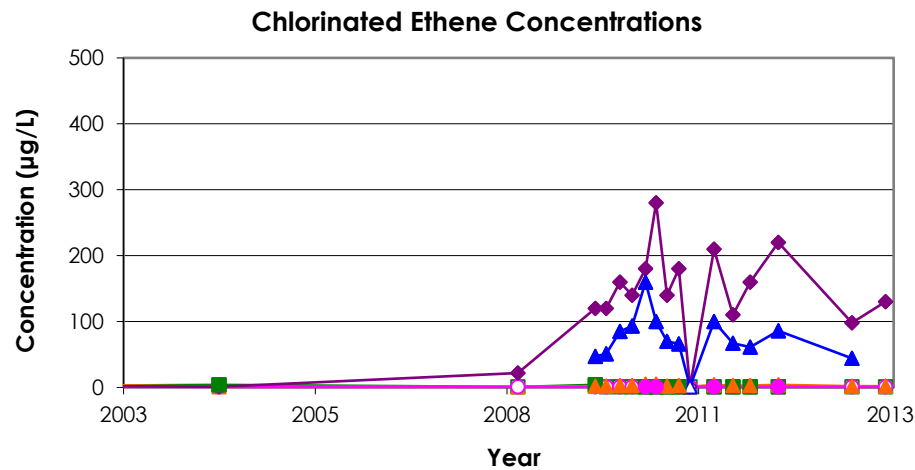


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

### COPC Concentration Time Trends at DW-72B

Atlantic Research Corporation, Gainesville, Virginia

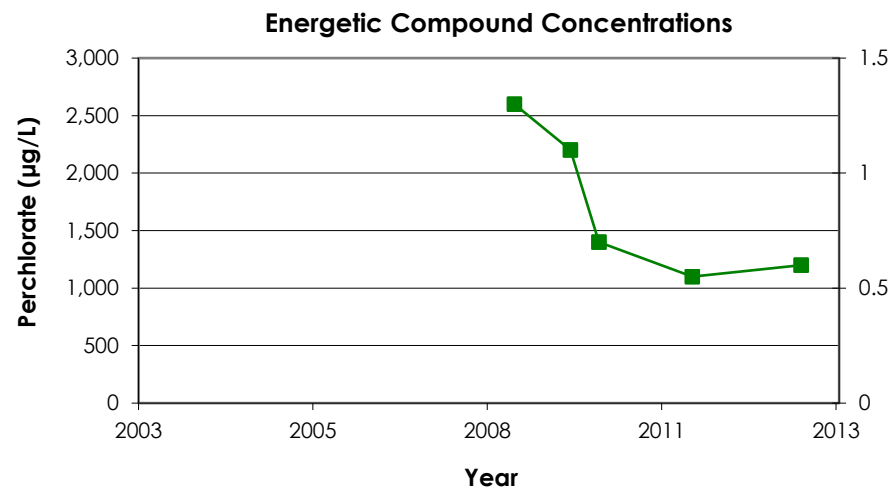
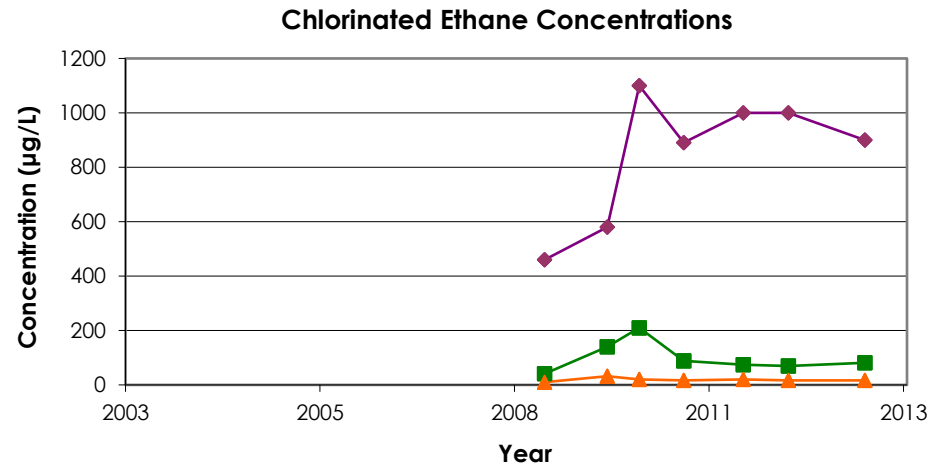
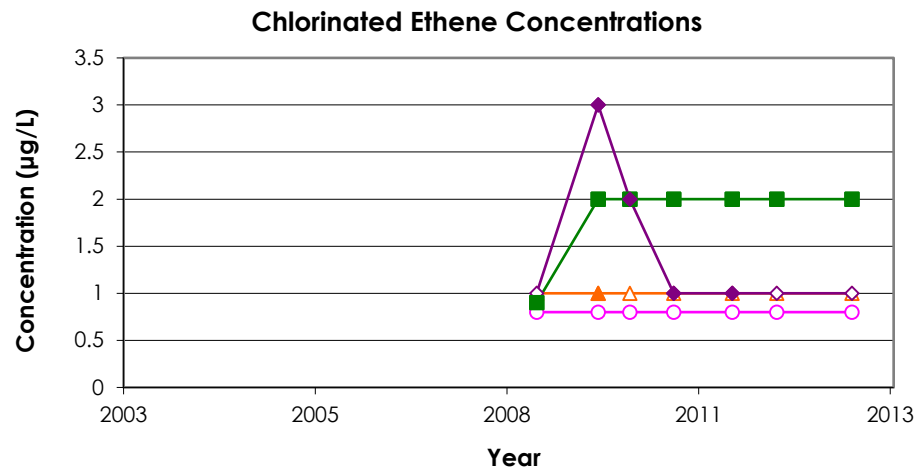


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Figure  
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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

#### Geochemical

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at DW-76-01

Atlantic Research Corporation, Gainesville, Virginia

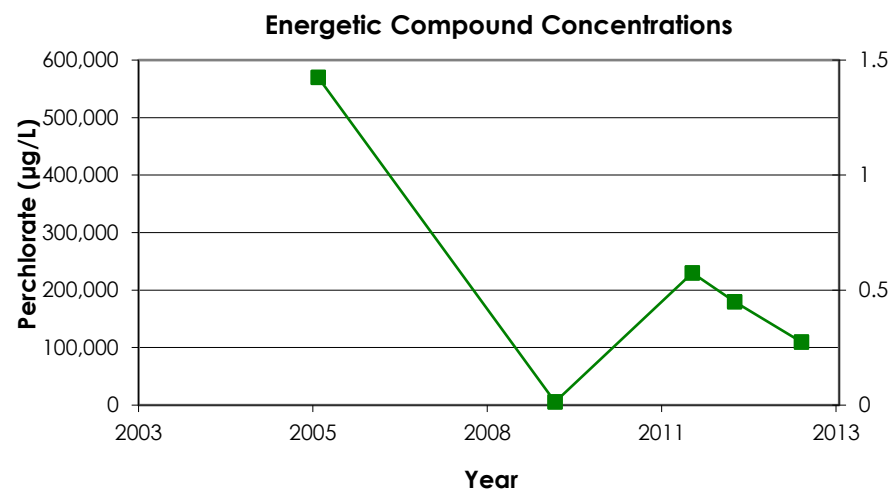
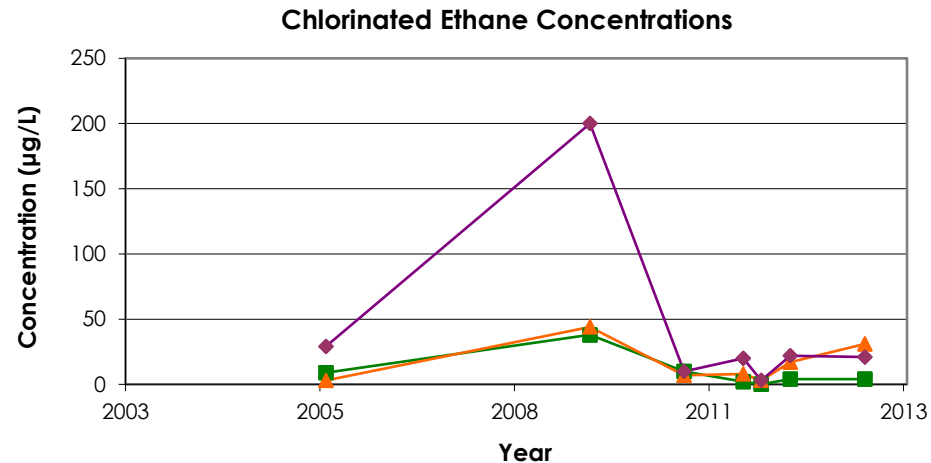
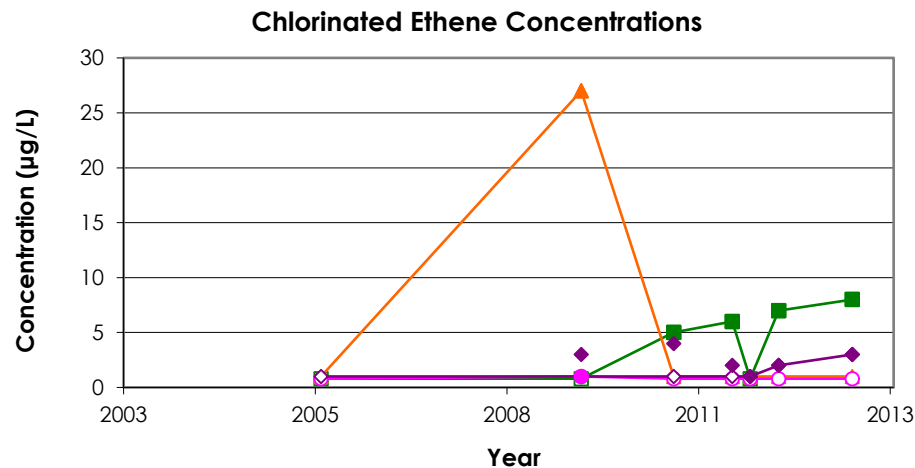


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February 2014

Figure  
B.35

\\Vencima-fil-1\company\Date\FH\G7\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix 02\_Deep Time Trend Plots\01.011



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ 1,1-Dichloroethene

#### Energetics

- Perchlorate

**Notes:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 2-9 for well location.

#### COPC Concentration Time Trends at IW-6

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

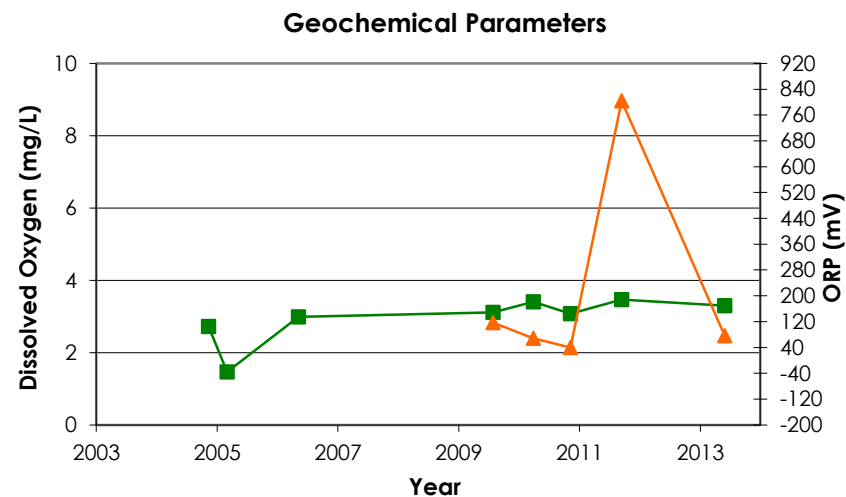
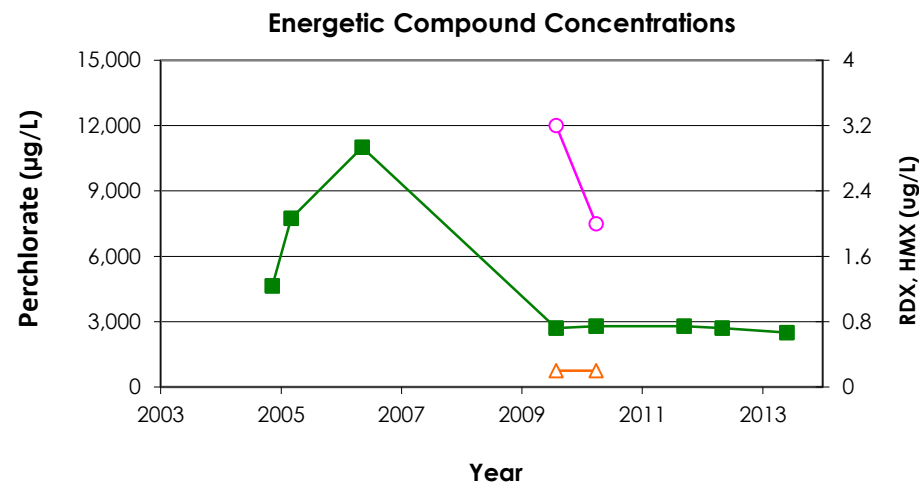
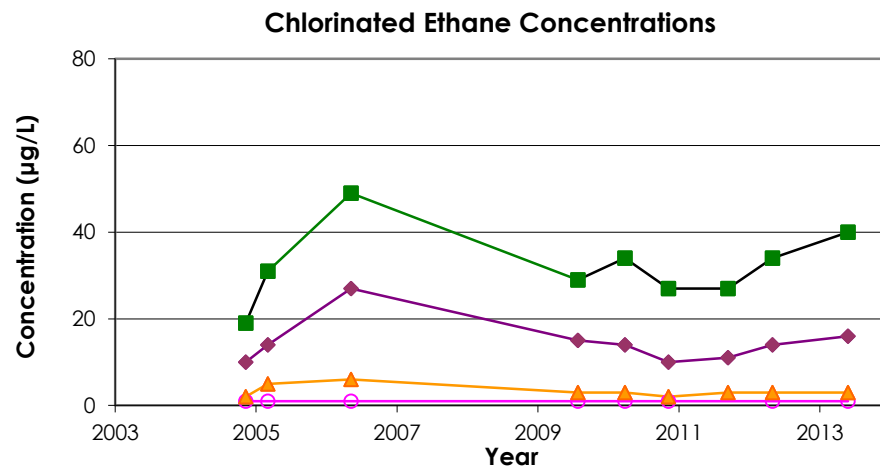
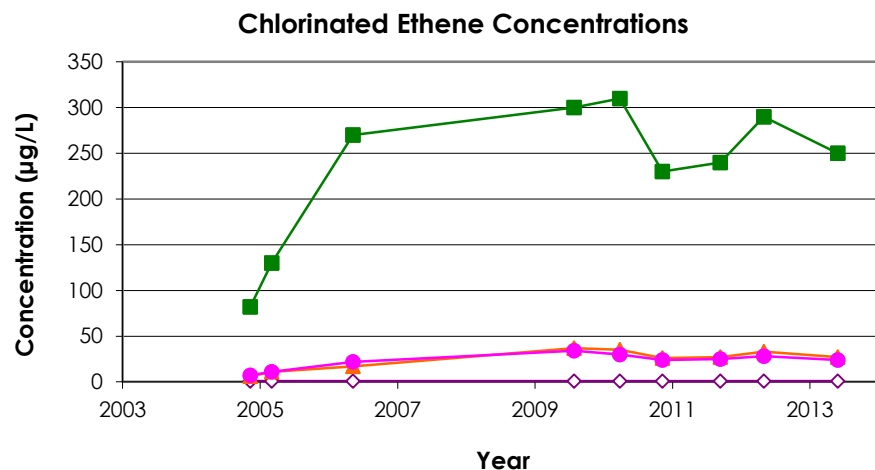
February 2014

Figure  
B.36

## **APPENDIX C**

### **SHALLOW GROUND WATER WELL TIME TREND CHARTS**

\\vendima01\p1\company\Data\VFHWG\Projects\Sequa Corporation\192457-0001-Gainesville-Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Small Time Trend plots-2014-02



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

### COPC Concentration Time Trends at BW 14-02S

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

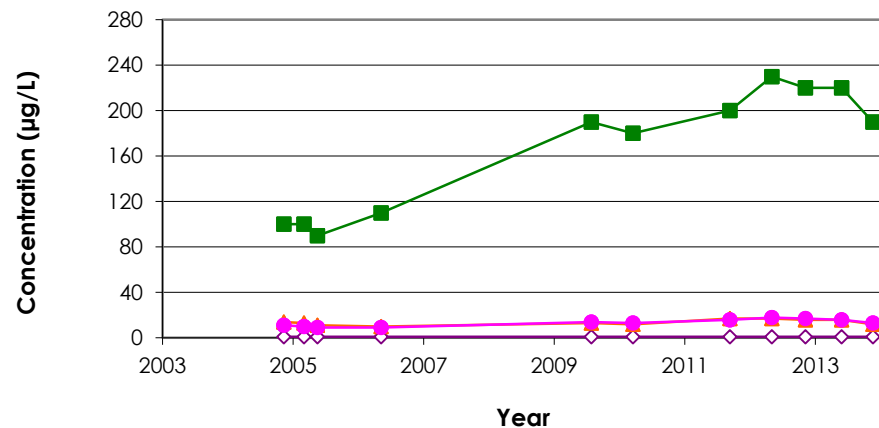
February 2014

Figure

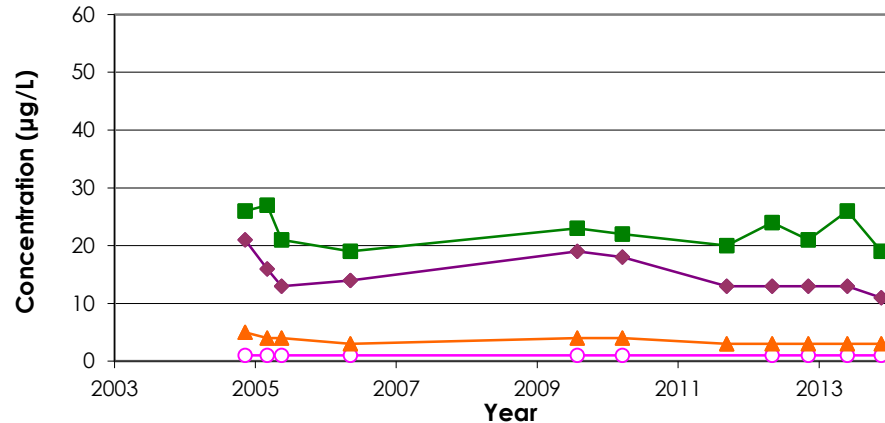
C.1

\\vendima\file\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plots-2014-10

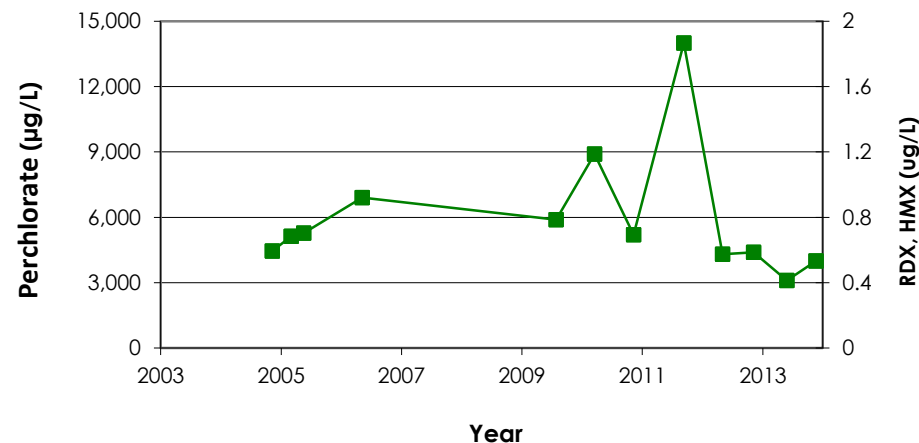
Chlorinated Ethene Concentrations



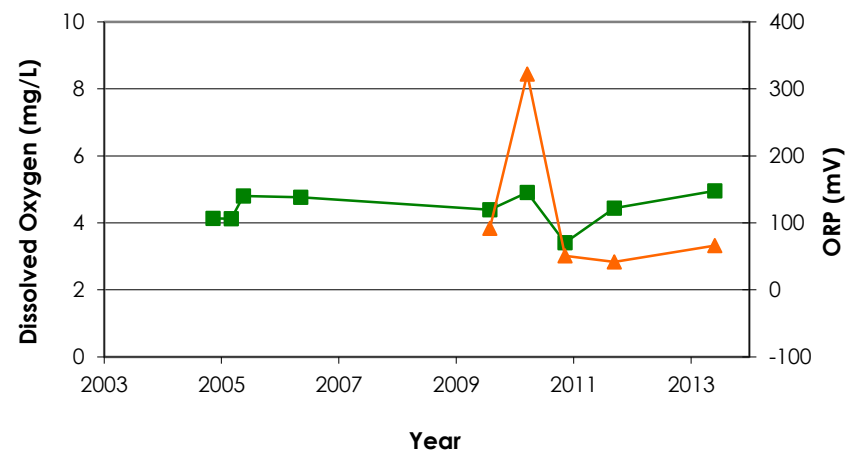
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

#### COPC Concentration Time Trends at BW 16-04D

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

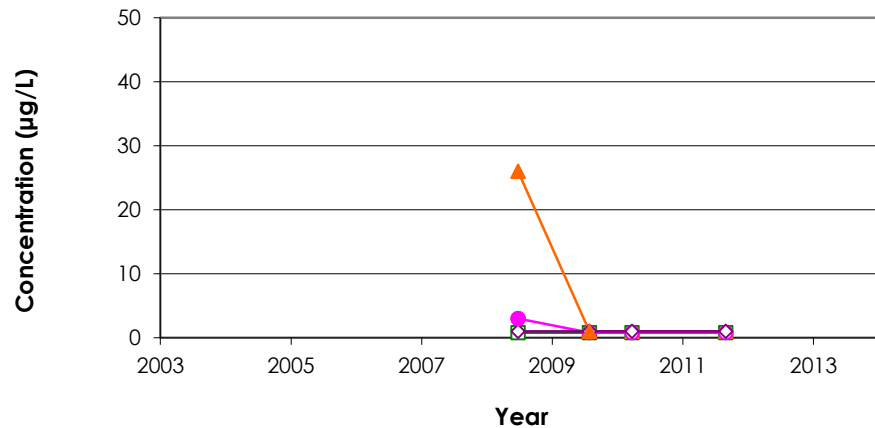
February 2014

Figure

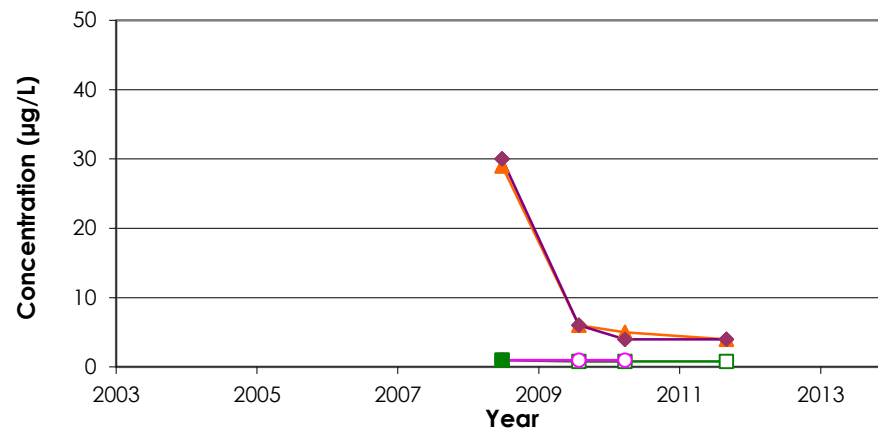
C.2

\\Vendima\file\company\Data\VFH\GT\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014-02

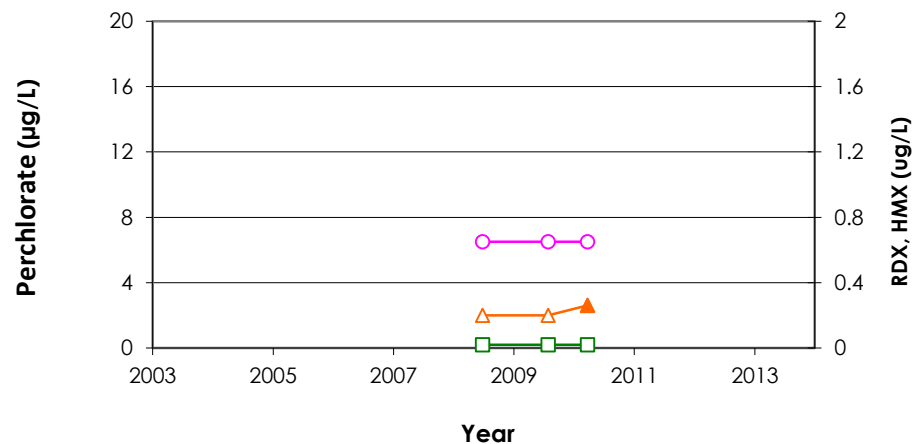
Chlorinated Ethene Concentrations



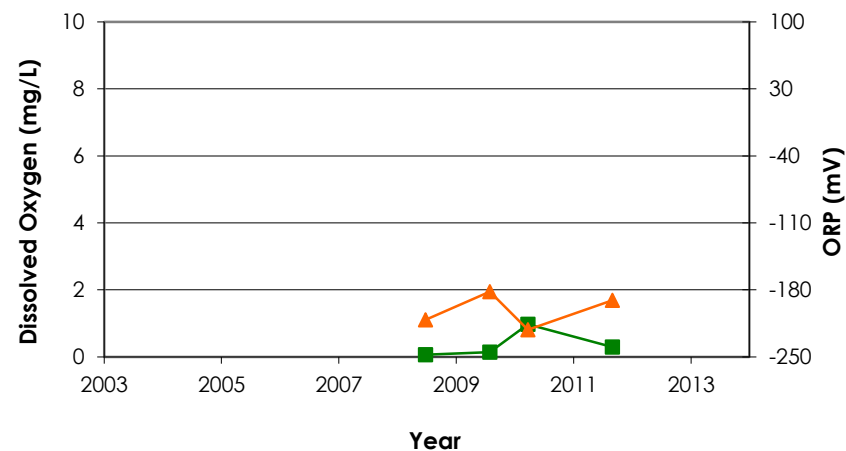
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethene
- ▲ 1,1-Dichloroethene
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 200-01

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

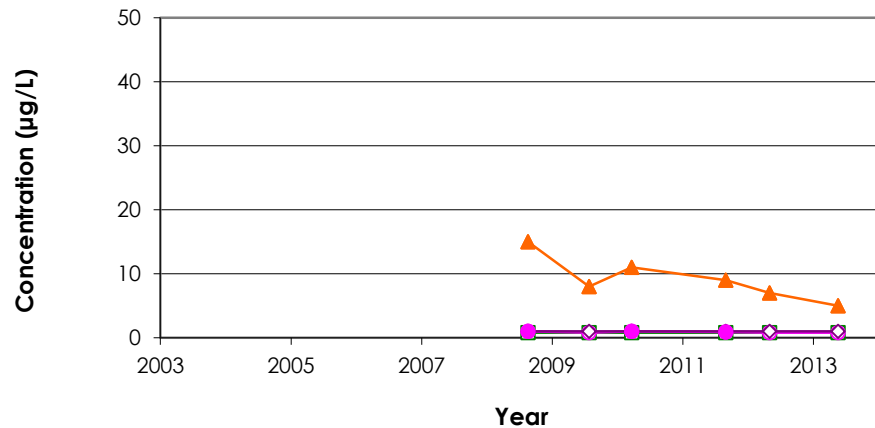
February 2014

Figure

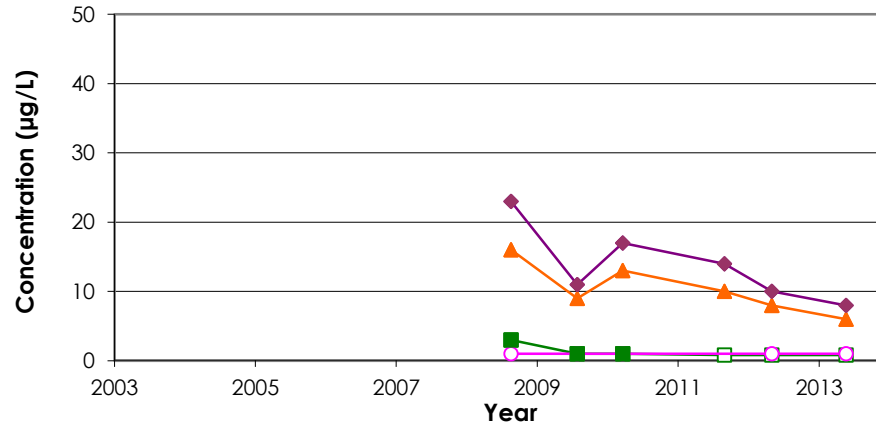
C.3

\\vncindia\h1\company\Data\VFH\GVT\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014-02

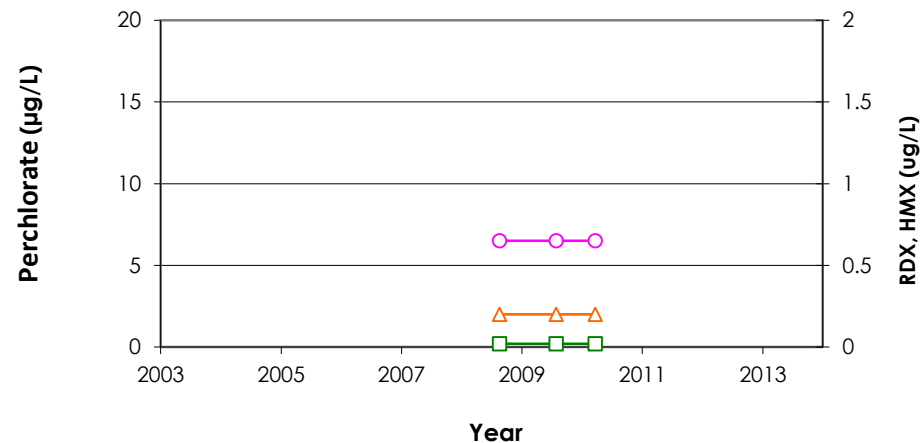
Chlorinated Ethene Concentrations



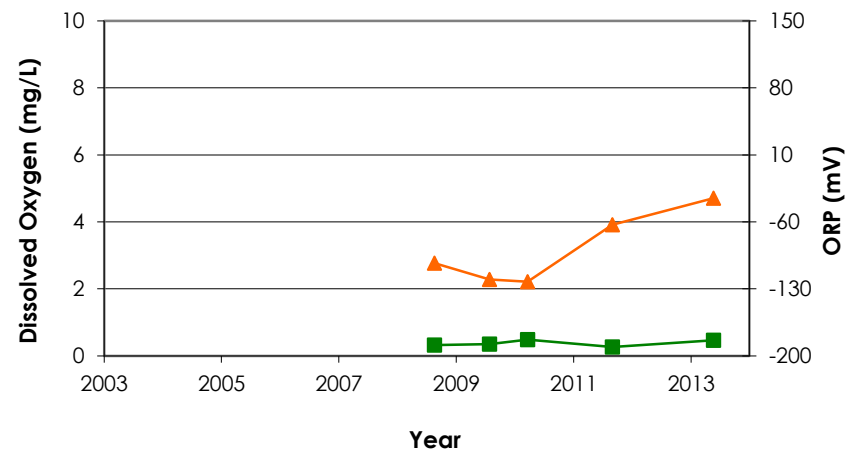
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 212-01

Atlantic Research Corporation, Gainesville, Virginia



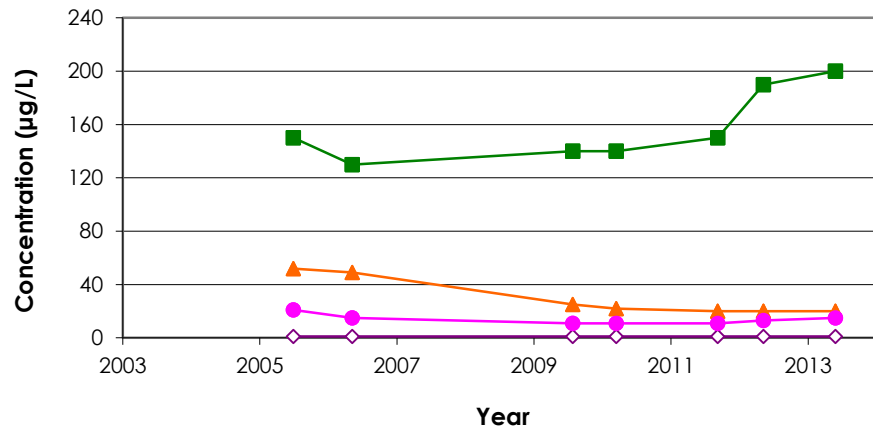
192457.0002.0000

February 2014

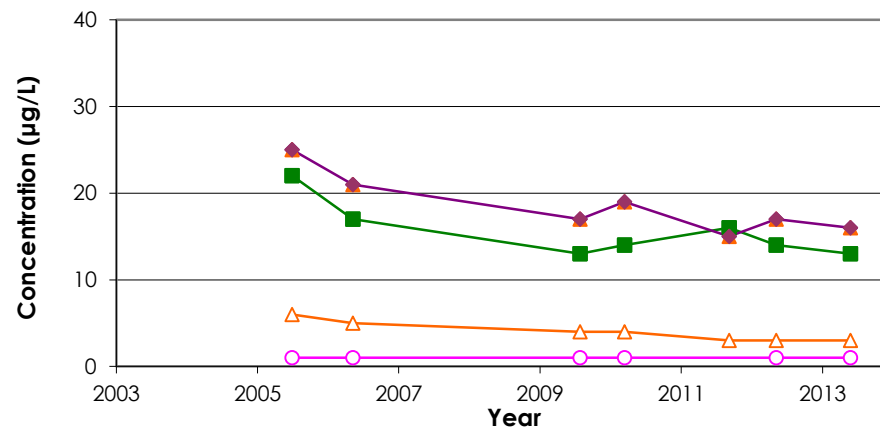
Figure

C.4

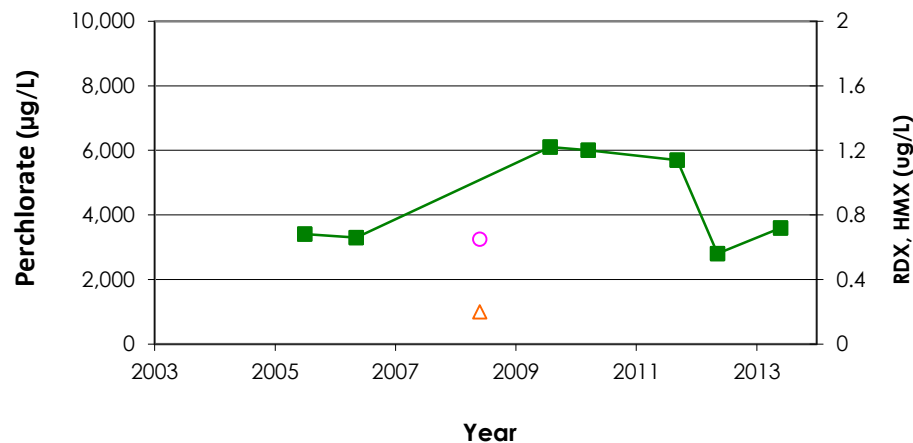
**Chlorinated Ethene Concentrations**



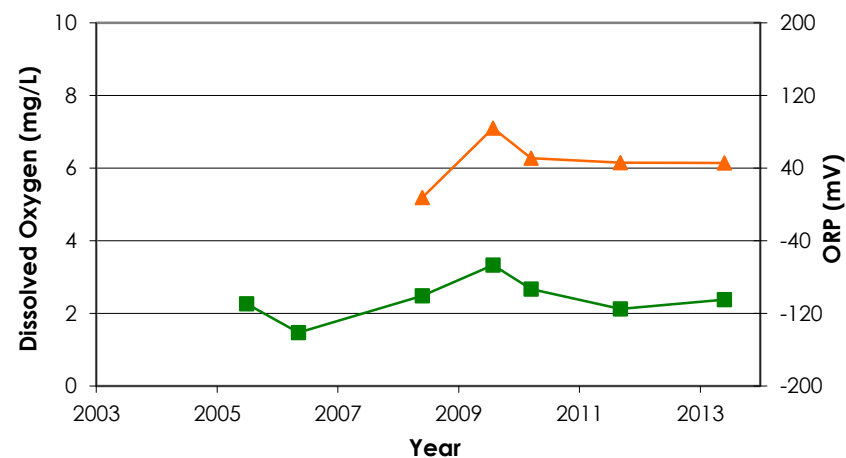
**Chlorinated Ethane Concentrations**



**Energetic Compound Concentrations**



**Geochemical Parameters**



**Ethenes**

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

**Ethanes**

- 1,1,1-Trichloroethane
- ▲ 1,1,2-Dichloroethane
- Chloroethane
- ◆ 1,1,1-Dichloroethane
- ▲ Ethane

**Energetics**

- Perchlorate
- ▲ RDX
- HMX

**Geochemical**

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

**COPC Concentration Time Trends at BW 28-02S**

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

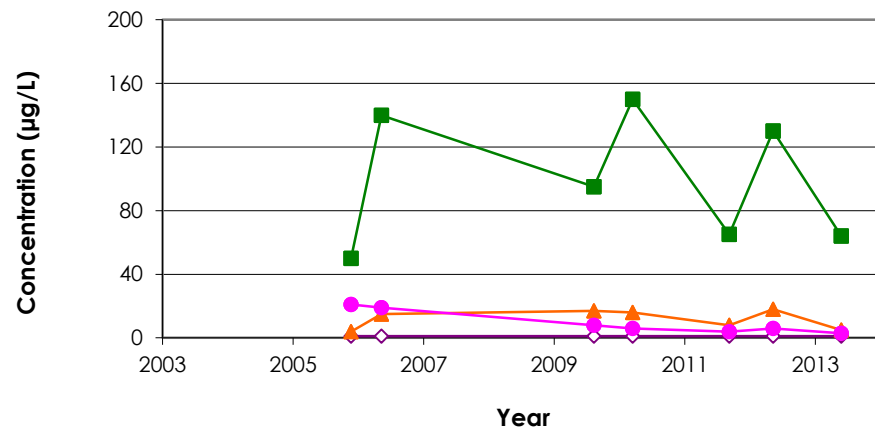
February 2014

Figure

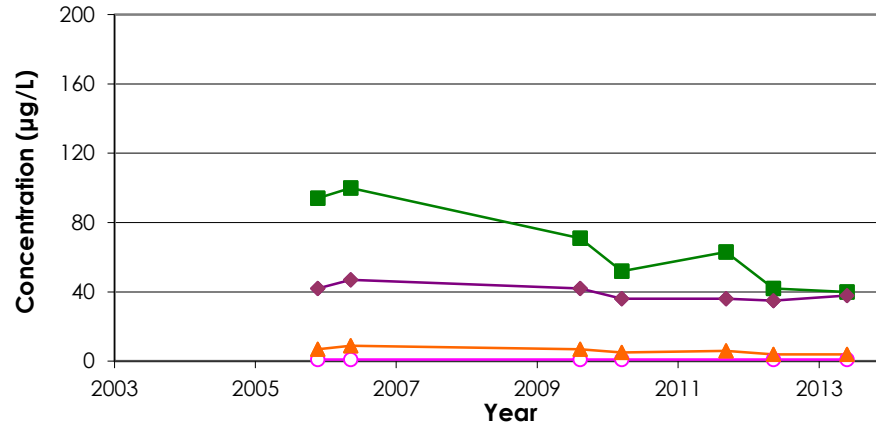
C.5

\\vencindia\file\company\Data\VFH\WGTV\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014-0

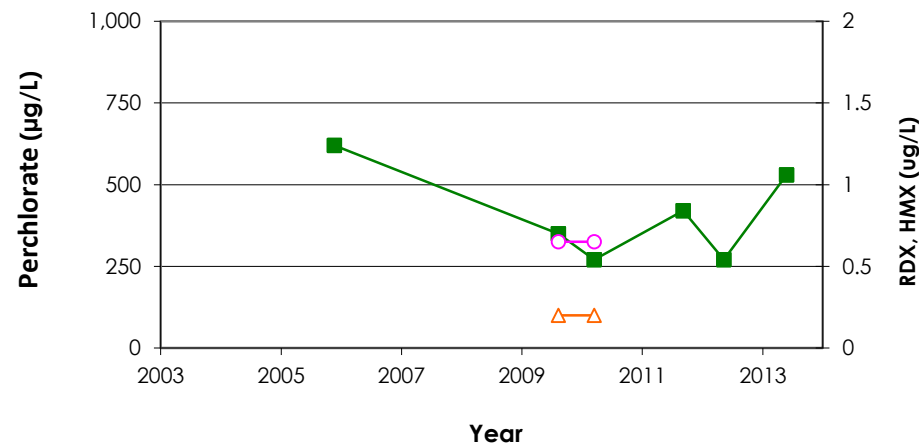
Chlorinated Ethene Concentrations



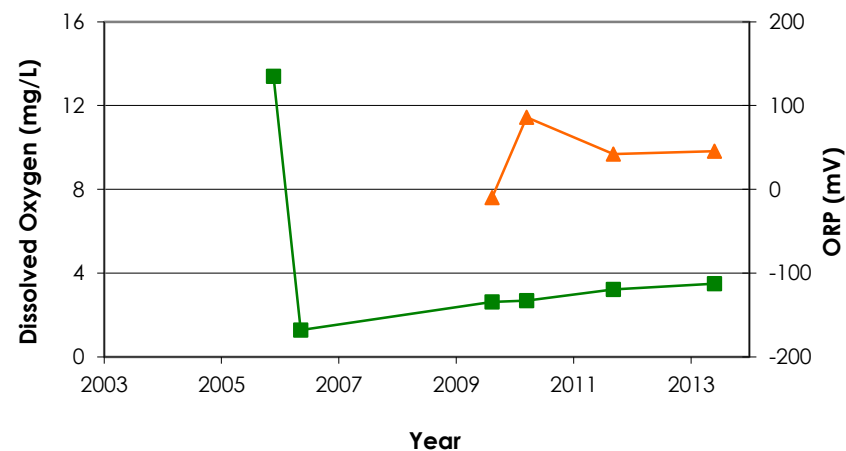
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 28-04D

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

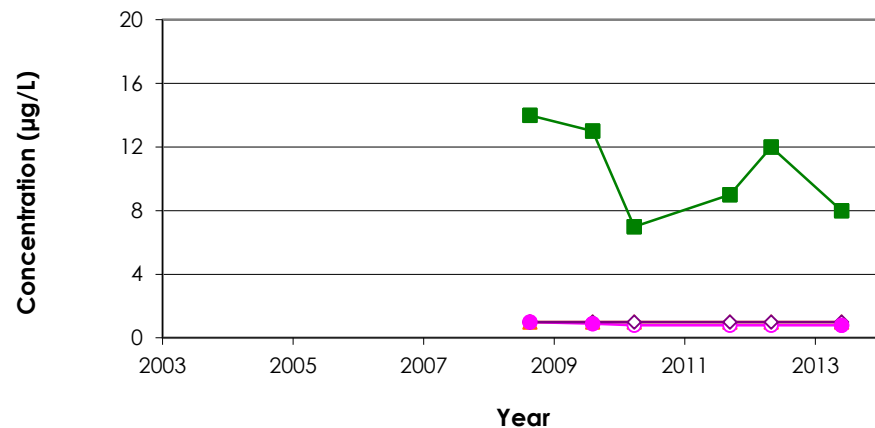
February 2014

Figure

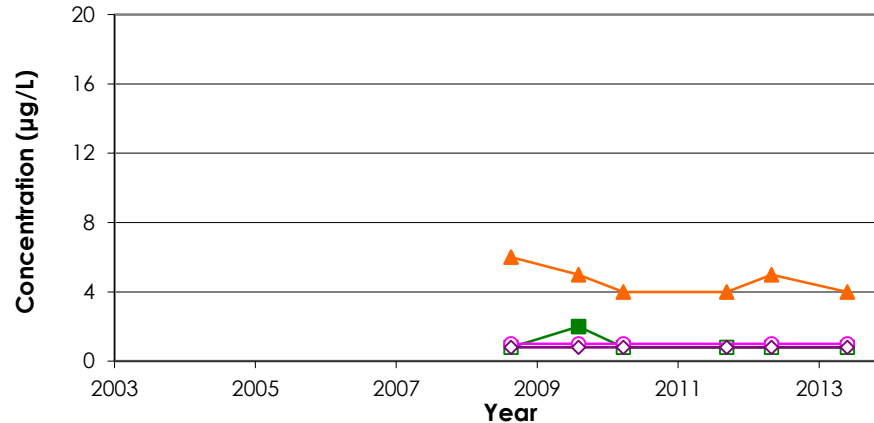
C.6

\\Vendima\file\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plots\2014

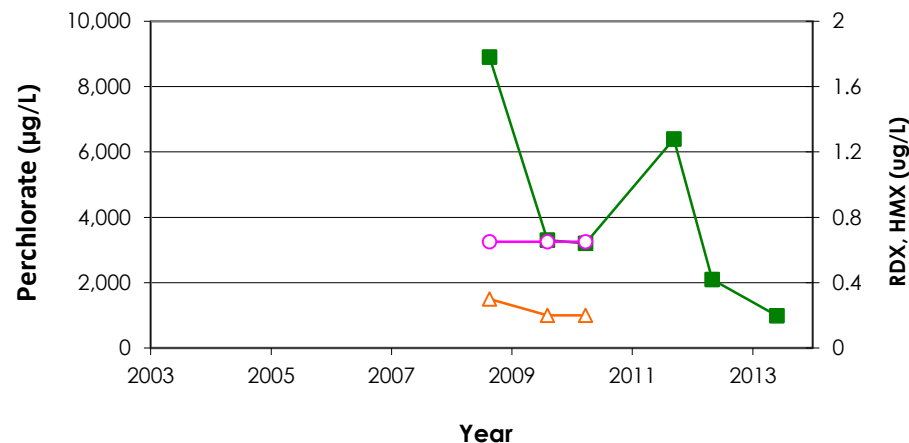
Chlorinated Ethene Concentrations



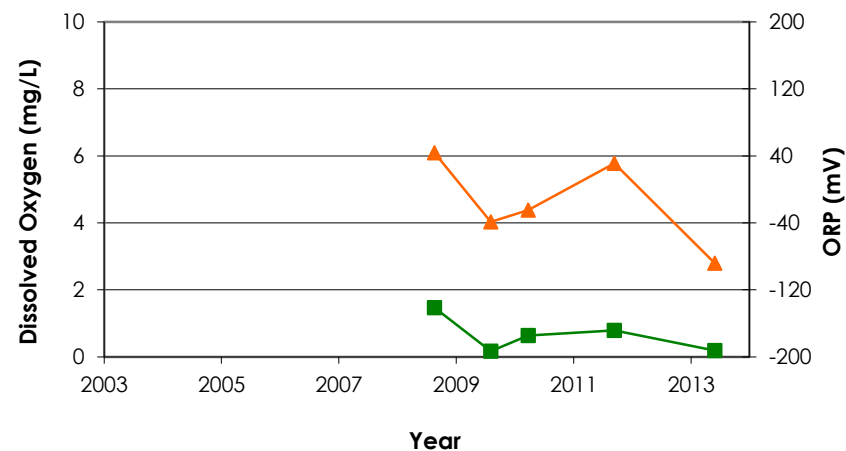
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 34-01

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

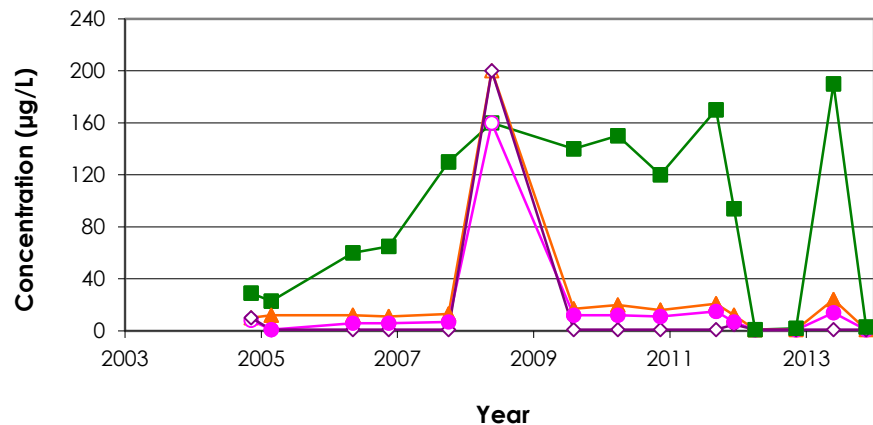
February 2014

Figure

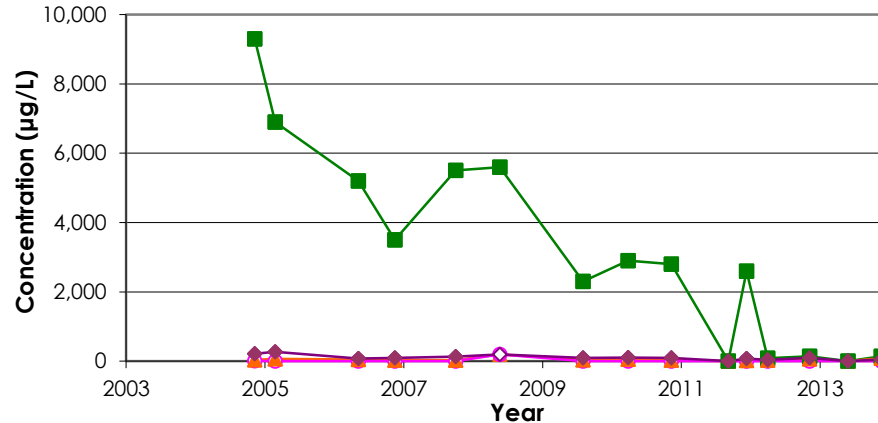
C.7

\\vncindia\file1\company\Data\VFH\GVI\Projects\Sequa Corporation\192457\0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix 03\_Snailflow Time Trend plot-2014-0

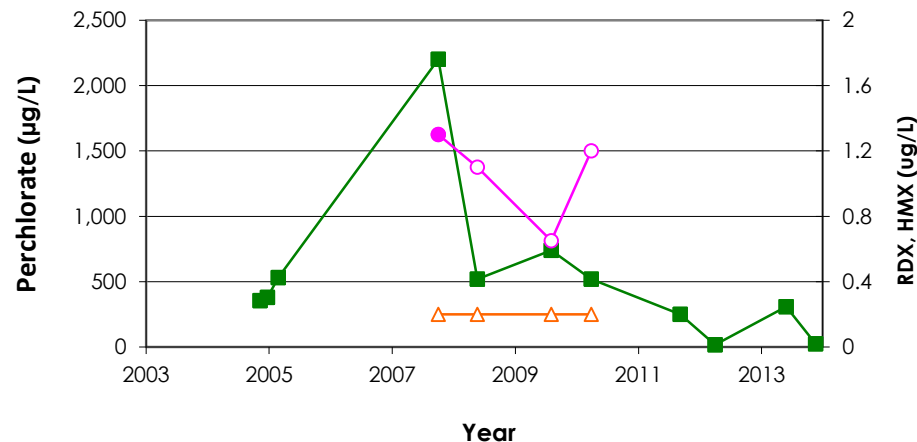
Chlorinated Ethene Concentrations



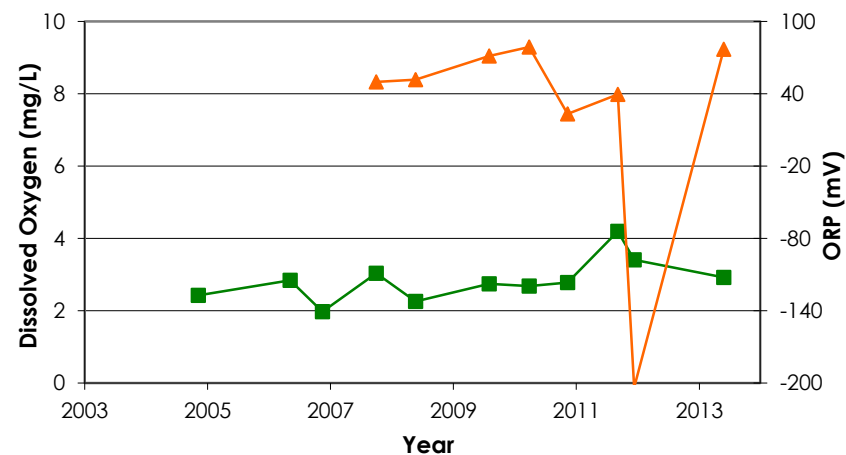
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

**COPC Concentration Time Trends at BW 5-05S**  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

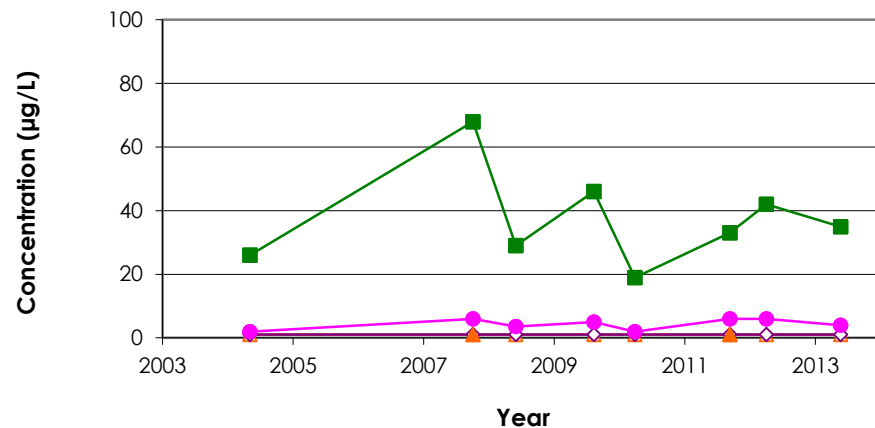
February 2014

Figure

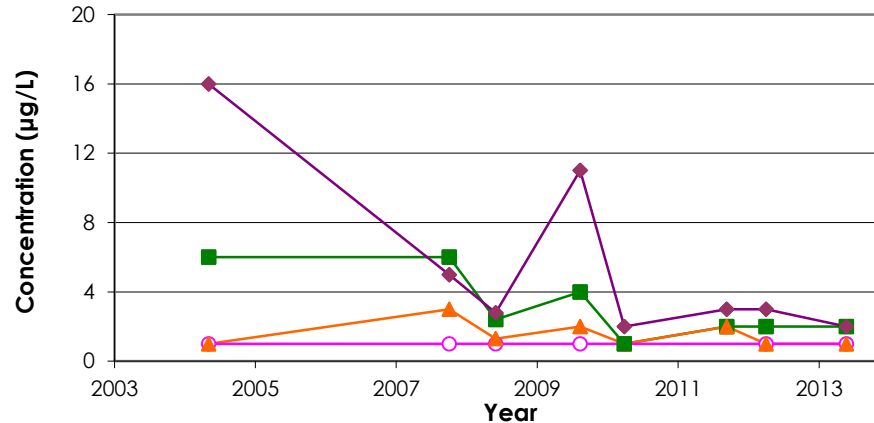
C.8

\\Vendima\file\company\Data\VFH\GVT\Projects\Sequa Corporation\192457\2001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plots\2014\_02

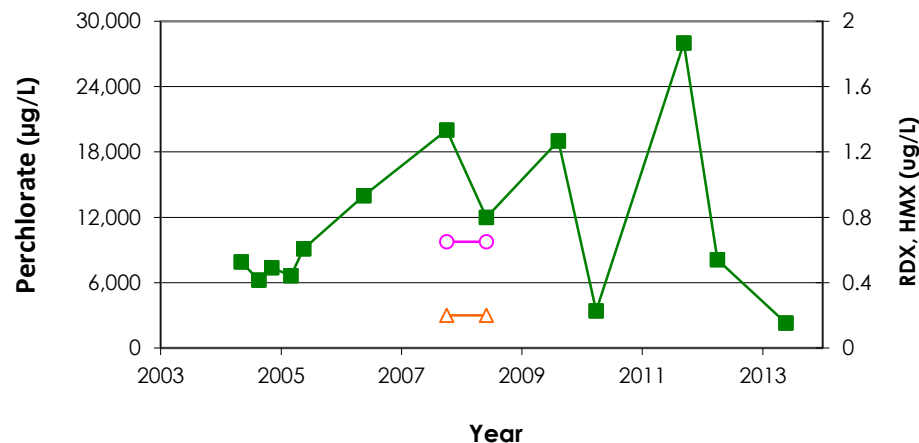
Chlorinated Ethene Concentrations



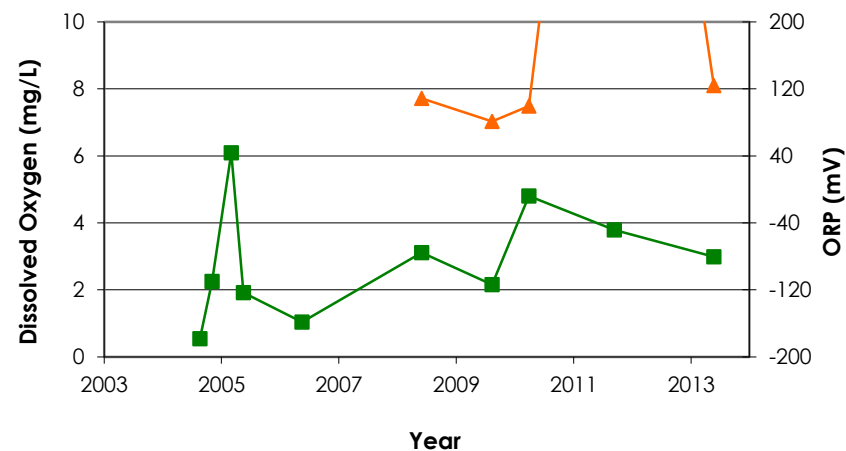
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW 105-03D

Atlantic Research Corporation, Gainesville, Virginia



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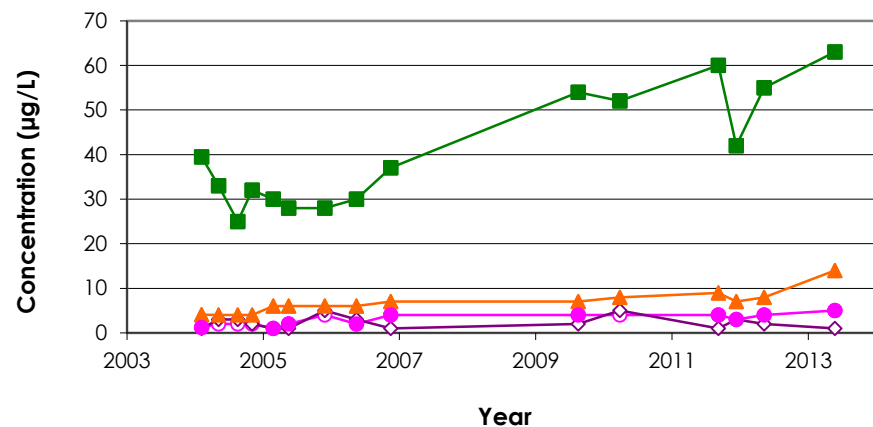
February 2014

Figure

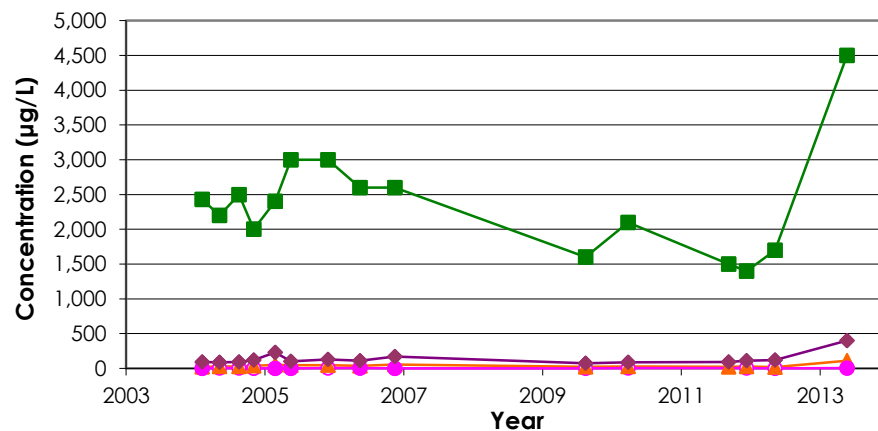
C.9

\\vencindm\file\company\Data\VFH\MGV\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix C03\_Slowflow Time Trend plot-2014-10

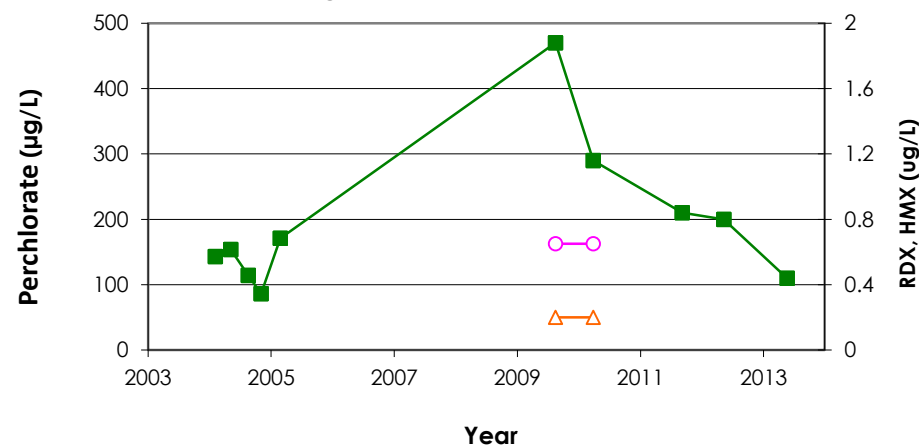
Chlorinated Ethene Concentrations



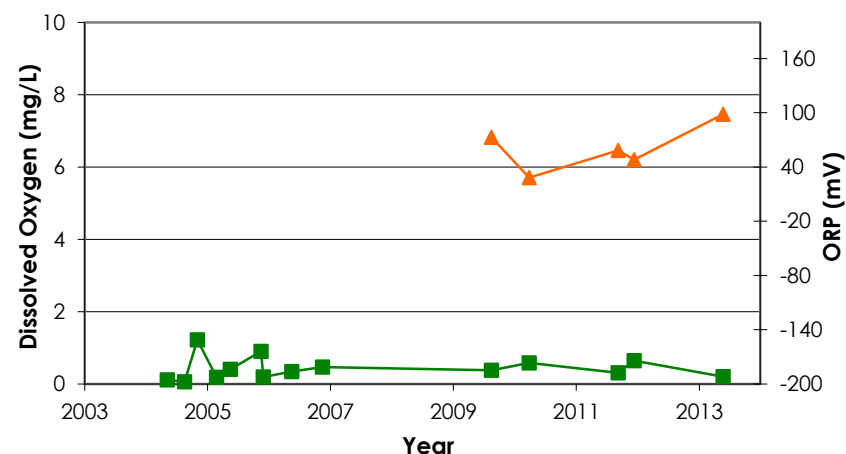
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

**COPC Concentration Time Trends at SW 15-02**  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

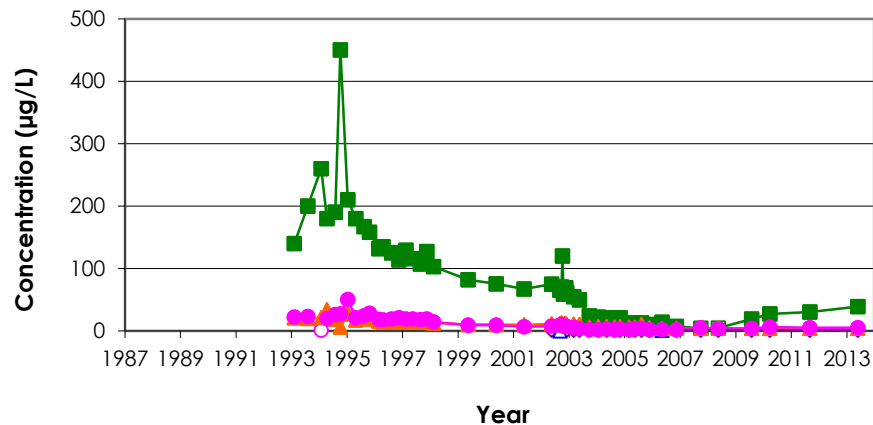
February 2014

Figure

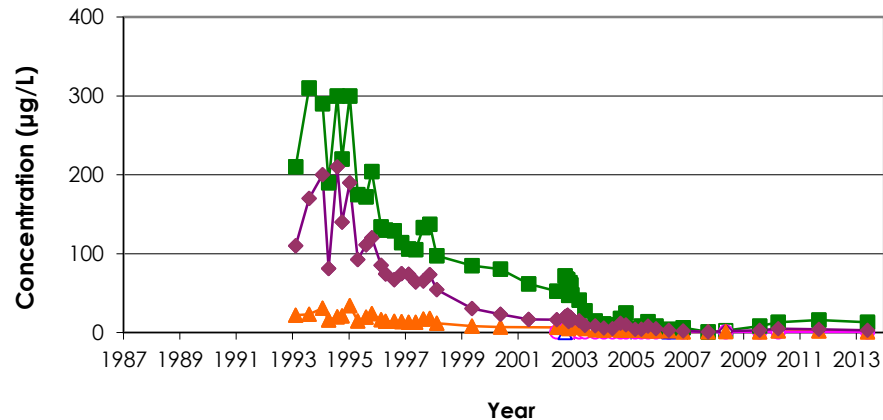
C.10

\\Vendima\fr\company\Data\VFH\GVT\Projects\Sequa Corporation\192457 0001- Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014-02

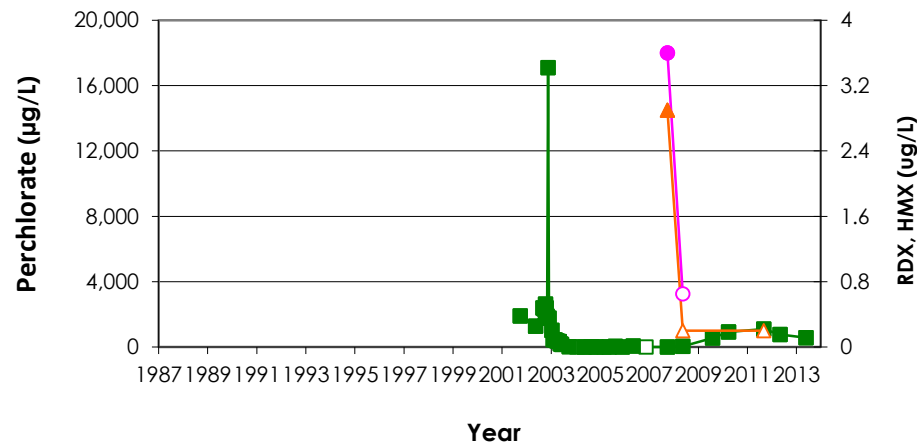
Chlorinated Ethene Concentrations



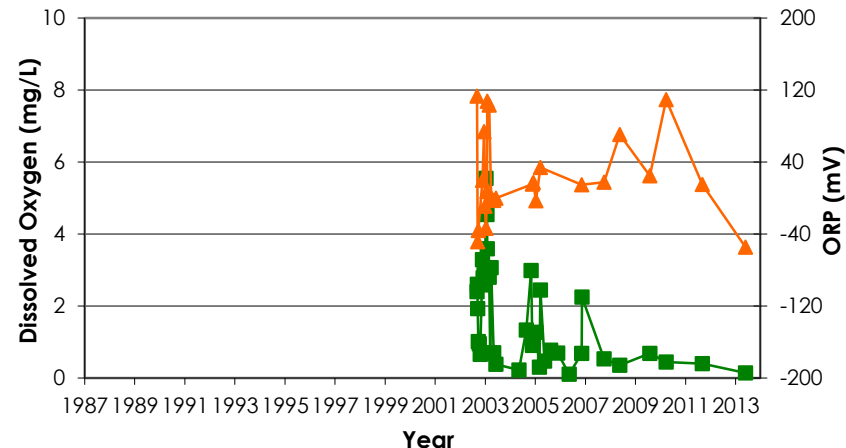
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

#### COPC Concentration Time Trends at SW 28-41

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

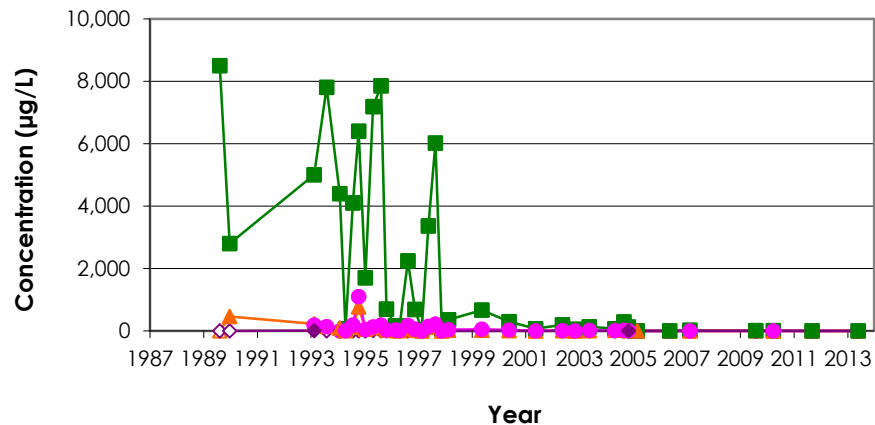
February 2014

Figure

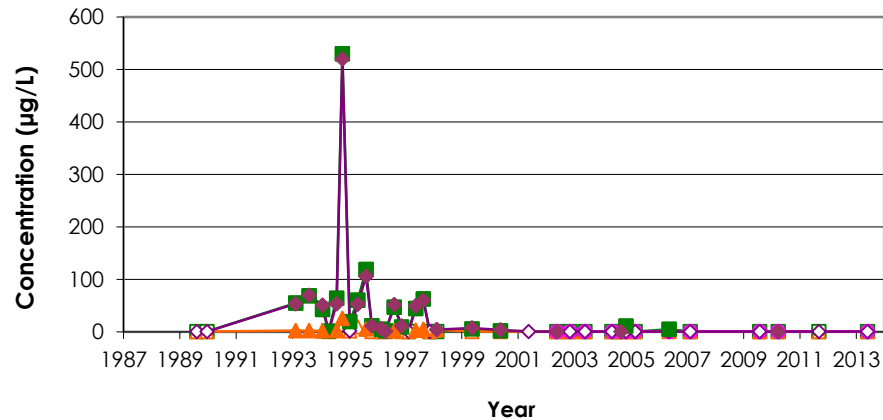
C.11

\\vncindm1\l\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix C3\_Slow Time Trend plot-2014

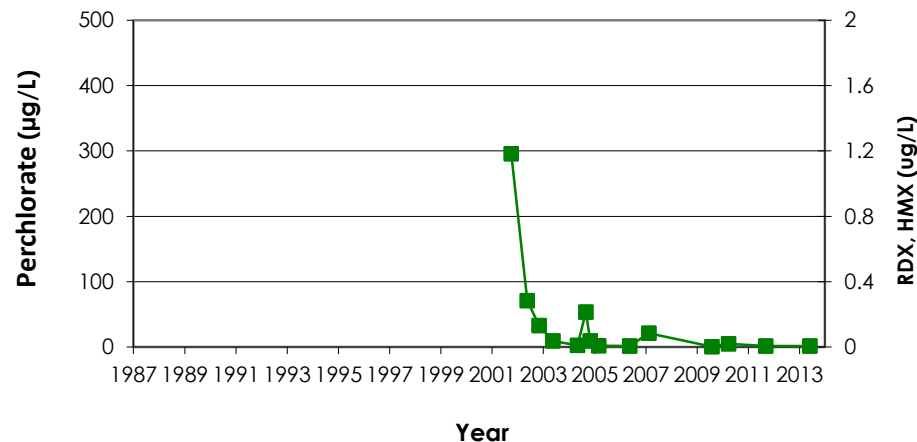
Chlorinated Ethene Concentrations



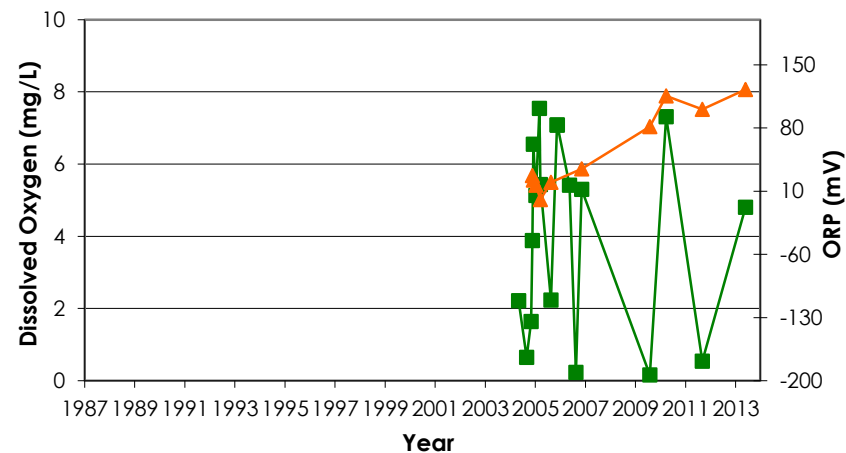
Chlorinated Ethene Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

Note: Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW 40-06

Atlantic Research Corporation, Gainesville, Virginia



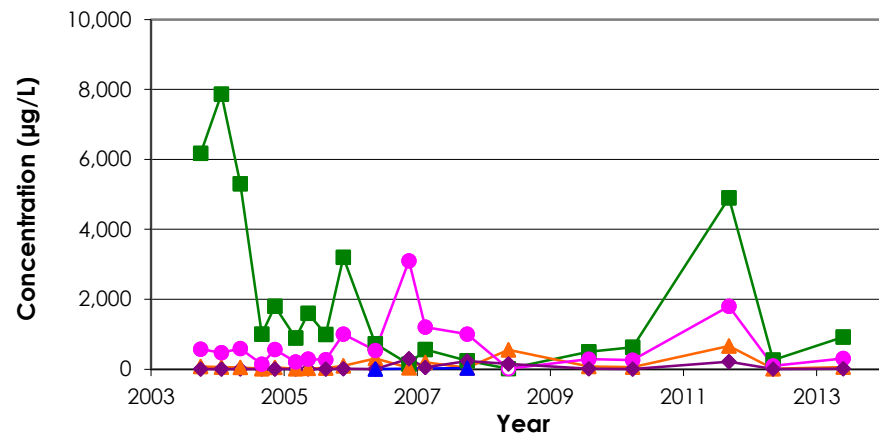
192457.0002.0000

February 2014

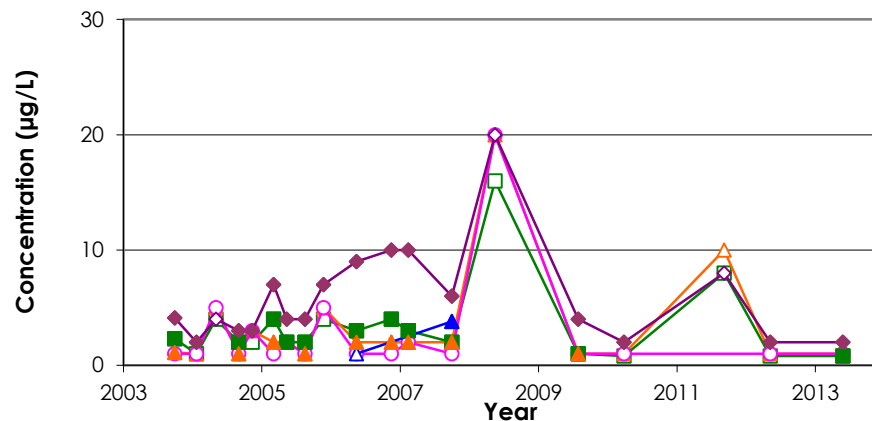
Figure

C.12

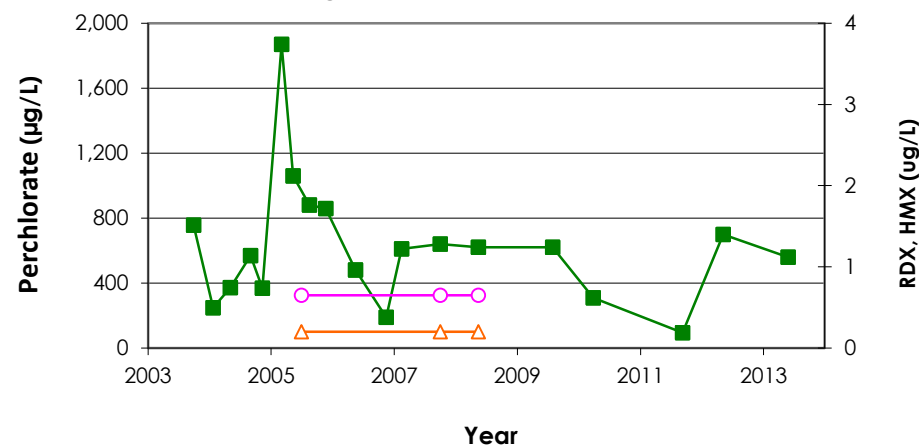
Chlorinated Ethene Concentrations



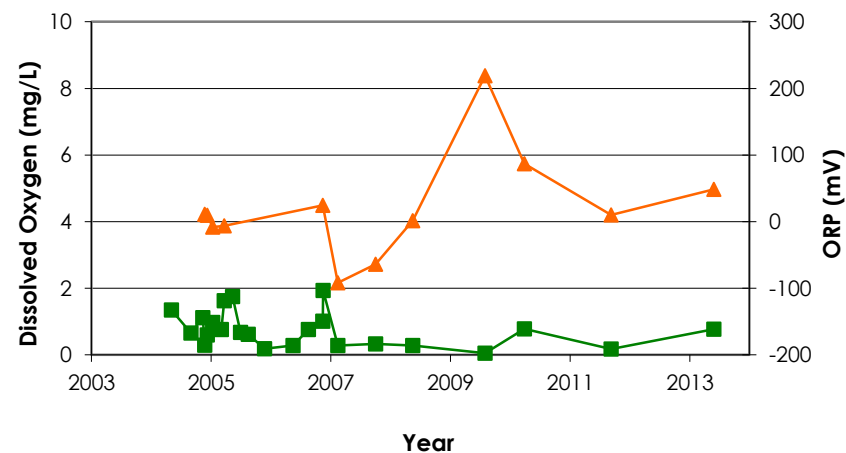
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW 40-07A

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

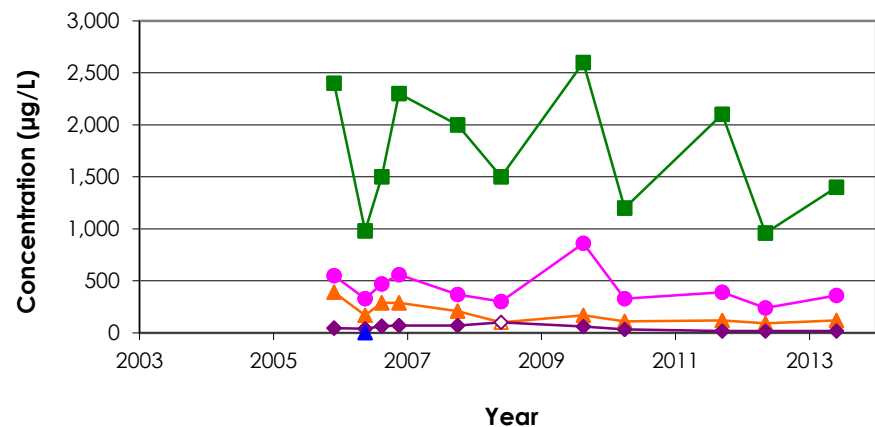
February 2014

Figure

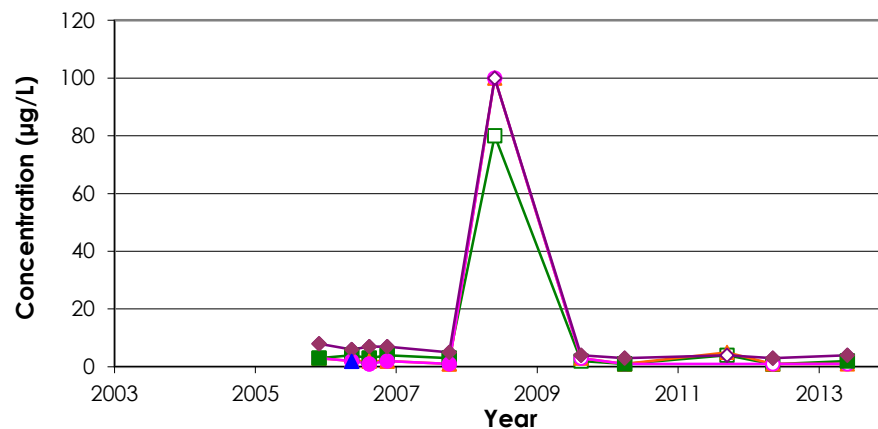
C.13

\\vncindm1\p1\company\Data\VFHWG\Projects\Sequa Corporation\192457\2001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014

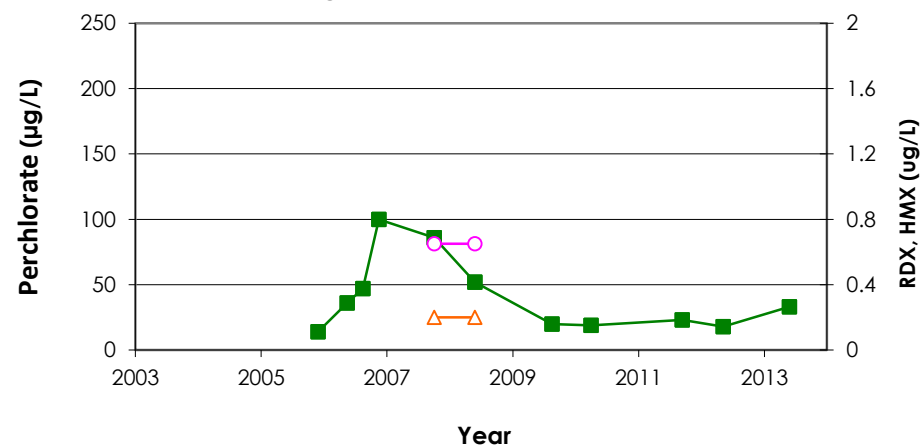
Chlorinated Ethene Concentrations



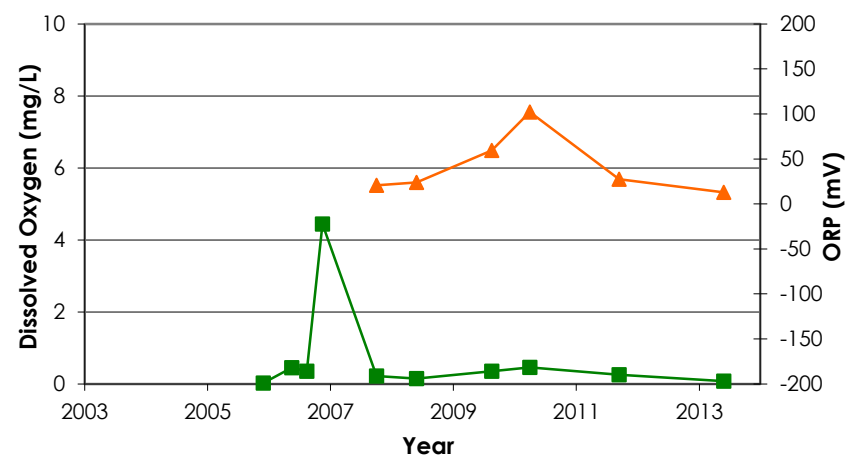
Chlorinated Ethene Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW 40-57

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

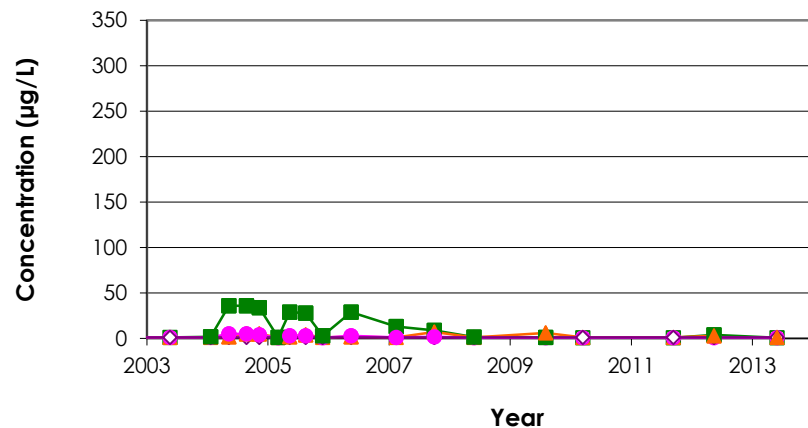
February 2014

Figure

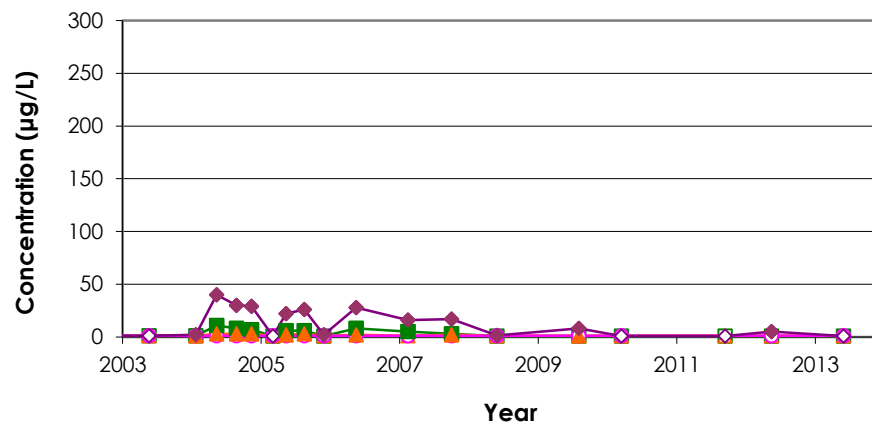
C.14

\\Vendima\file\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Shrallow Time Trend plots-2014-0

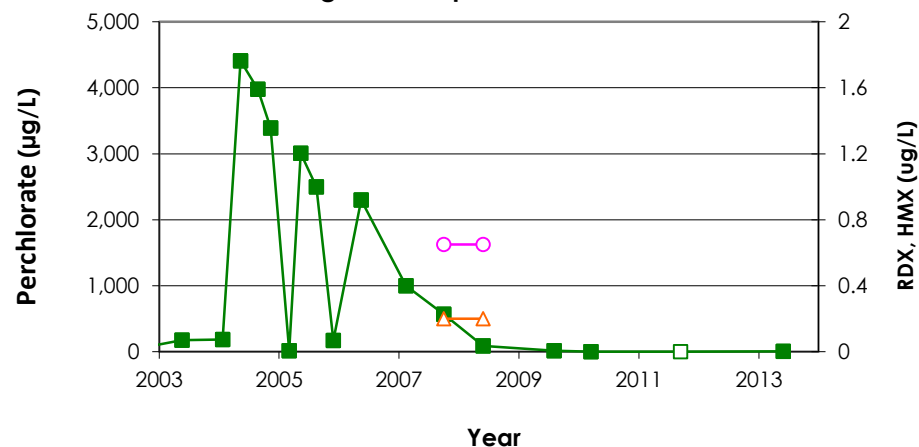
Chlorinated Ethene Concentrations



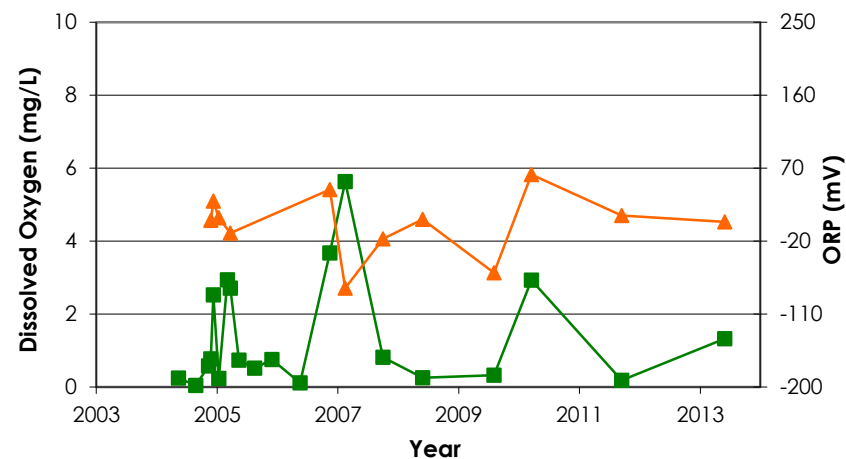
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

#### COPC Concentration Time Trends at SW 40-51

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

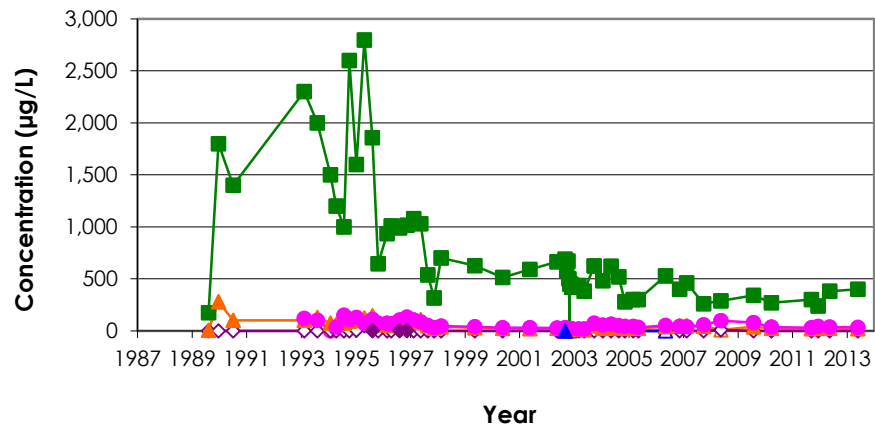
February 2014

Figure

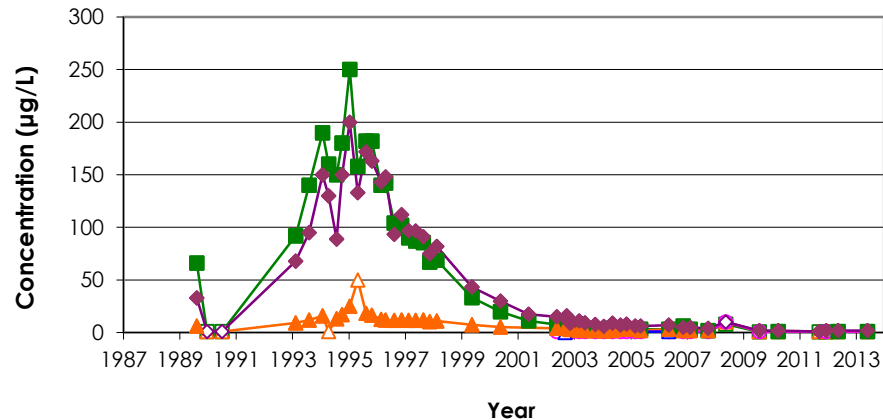
C.15

\\Vendima\file\company\Data\VFH\MGV\Projects\Sequa Corporation\192457\0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014

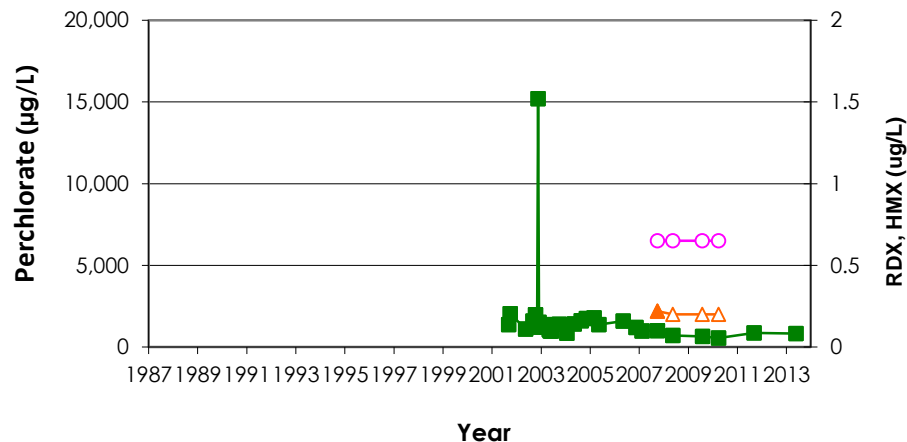
Chlorinated Ethene Concentrations



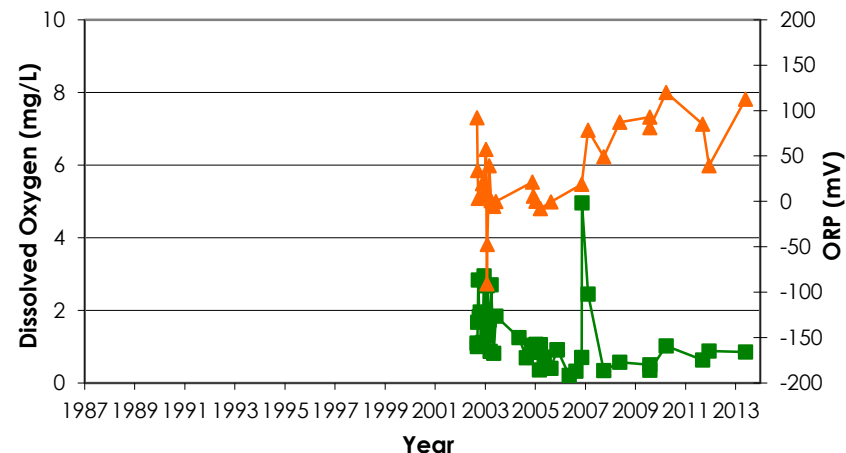
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

#### COPC Concentration Time Trends at SW 46-01

Atlantic Research Corporation, Gainesville, Virginia



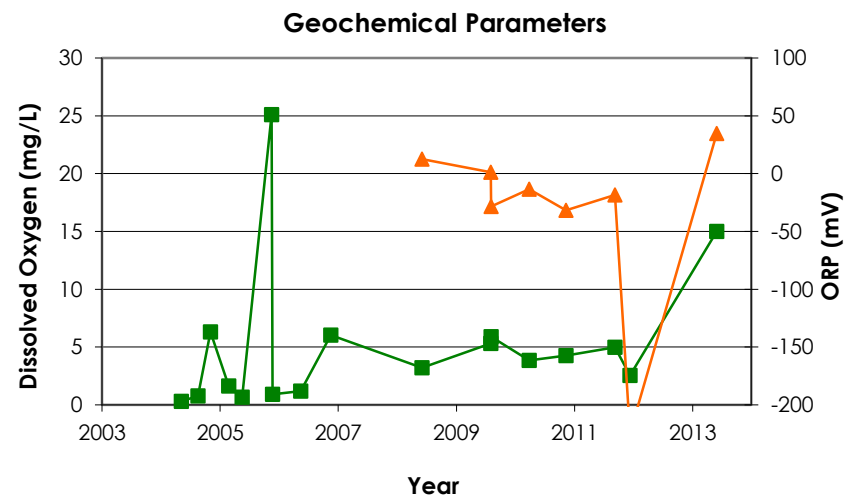
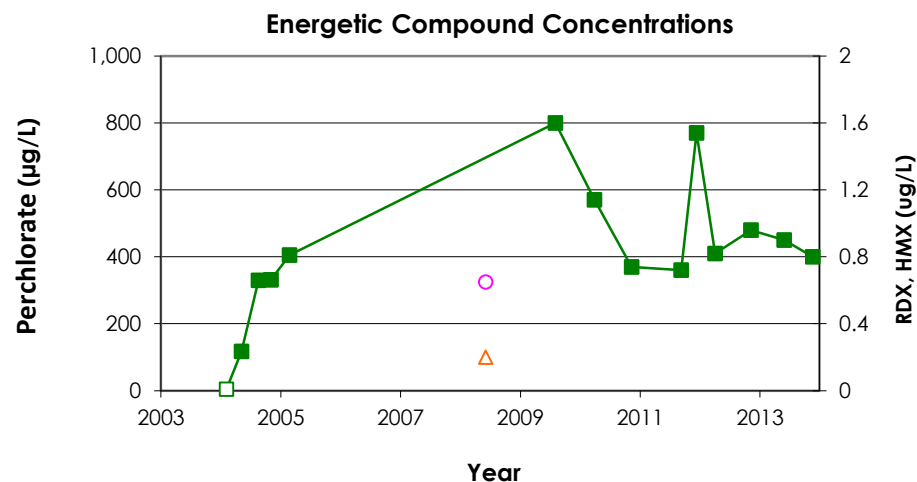
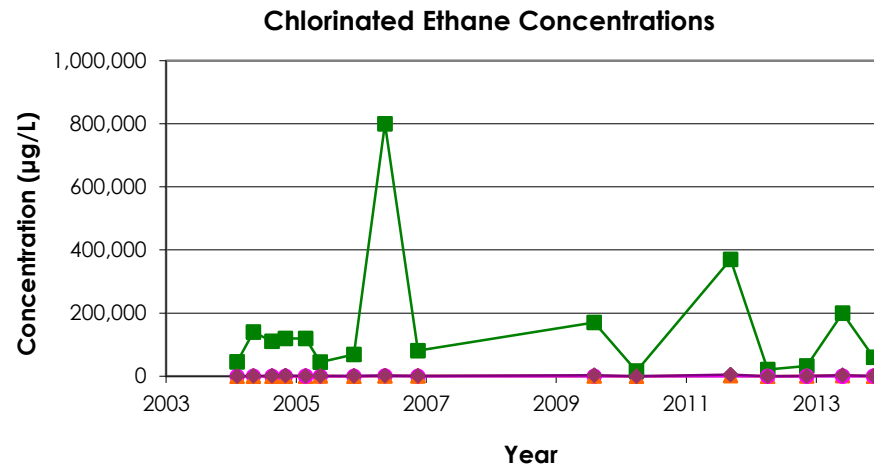
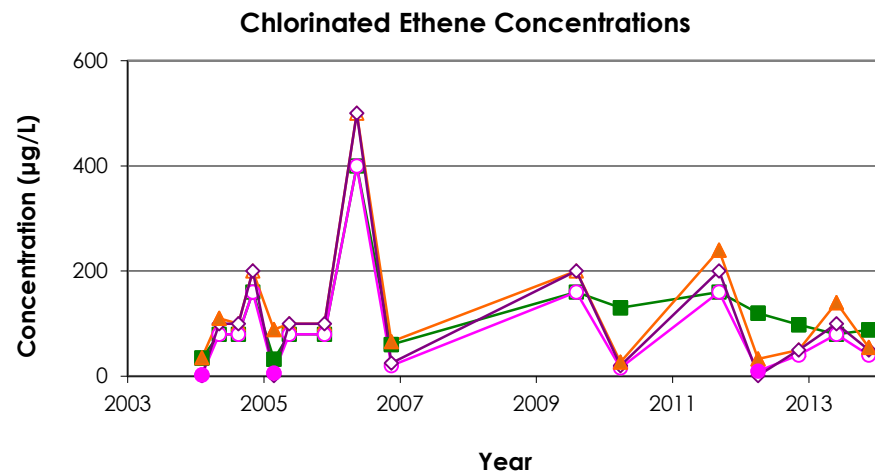
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Figure

C.16

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

### COPC Concentration Time Trends at SW 5-04

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

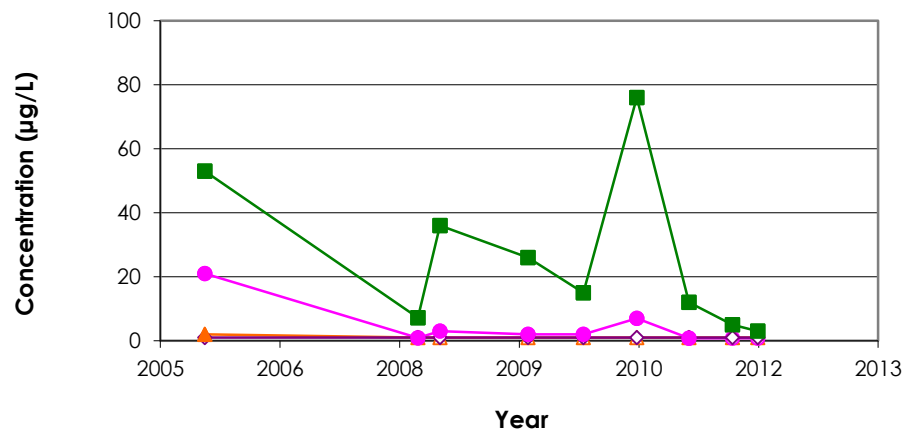
February 2014

Figure

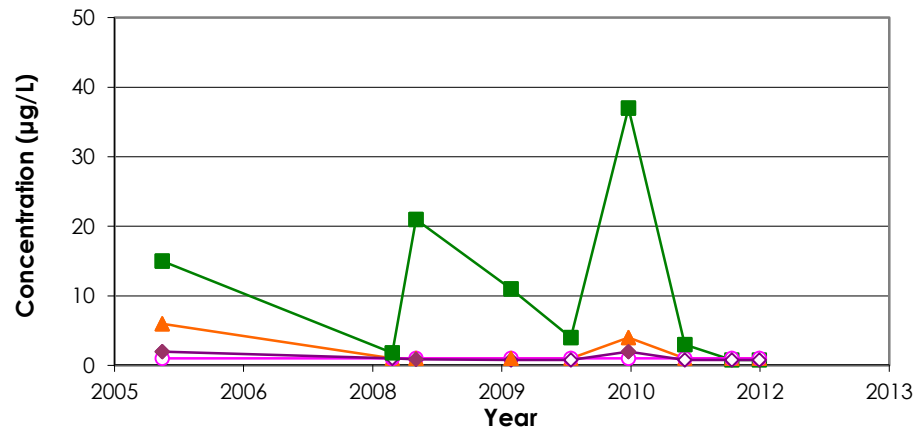
C.17

\\Vendima\file\company\Data\VFH\MG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix C3\_Snailow Time Trend plot-2014-20

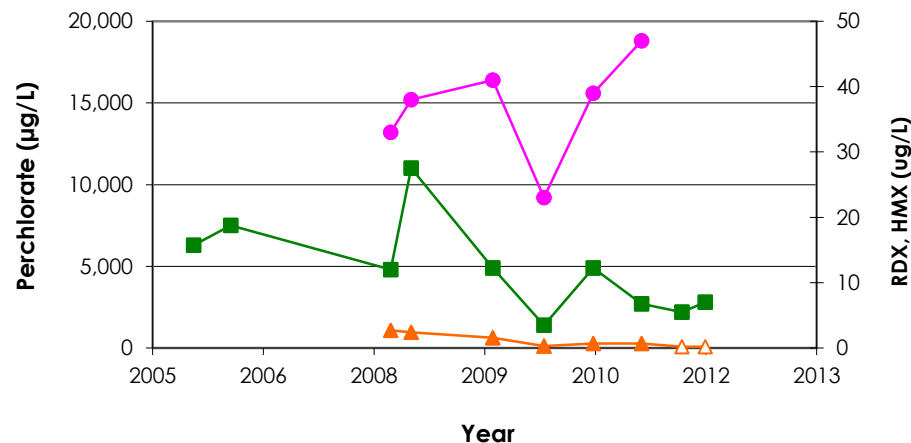
### Chlorinated Ethene Concentrations



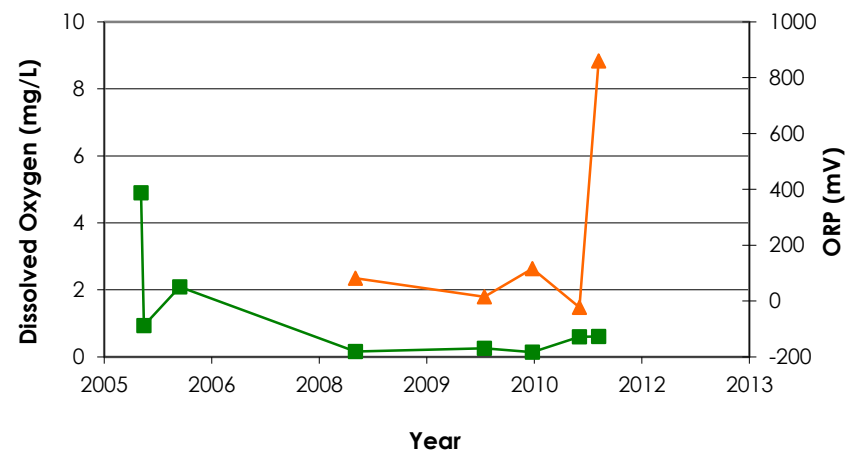
### Chlorinated Ethane Concentrations



### Energetic Compound Concentrations



### Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethane
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

### COPC Concentration Time Trends at BW TTU-02D

Atlantic Research Corporation, Gainesville, Virginia



Figure

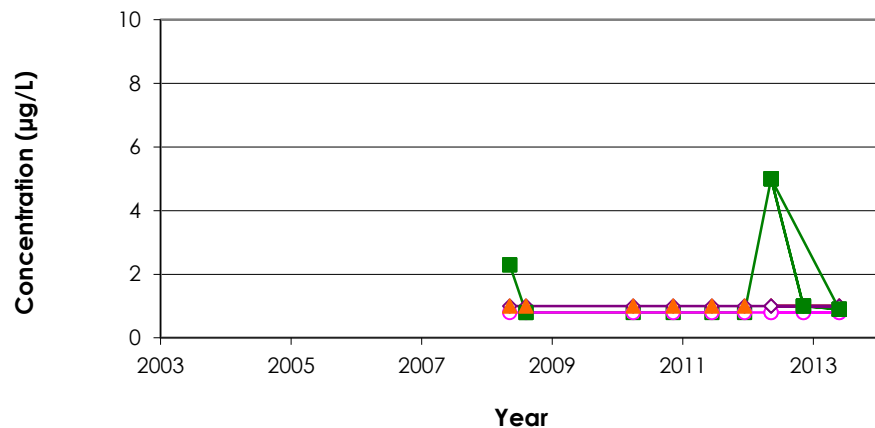
C.18

192457.0002.0000

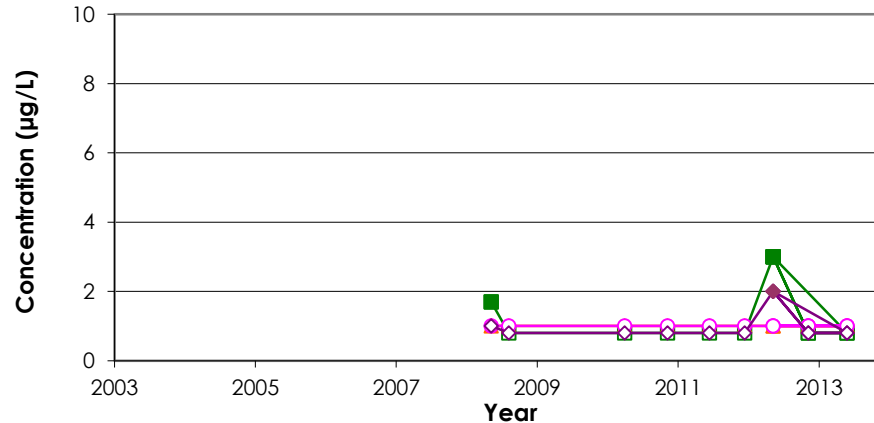
February 2014

\\vncindia\file\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Shrallow Time Trend plots-2014-0

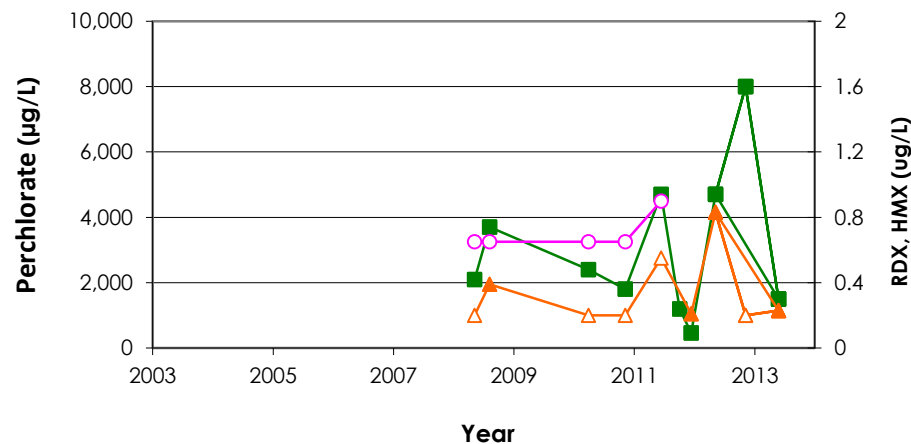
Chlorinated Ethene Concentrations



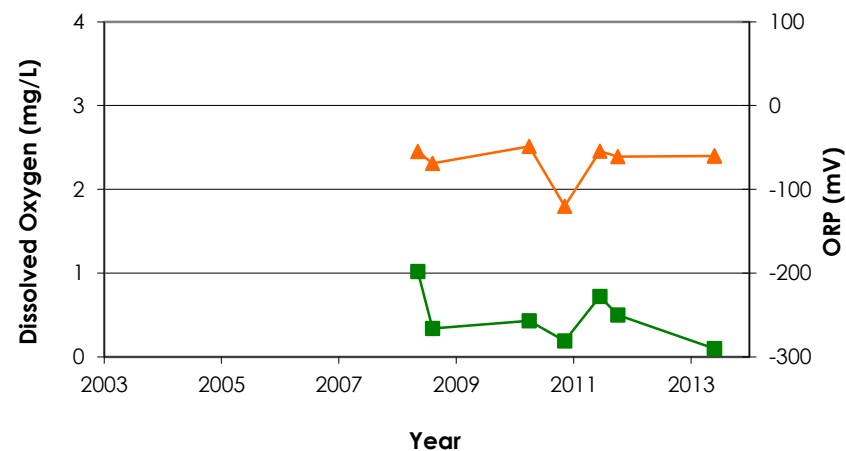
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene-line
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW TTU-05

Atlantic Research Corporation, Gainesville, Virginia



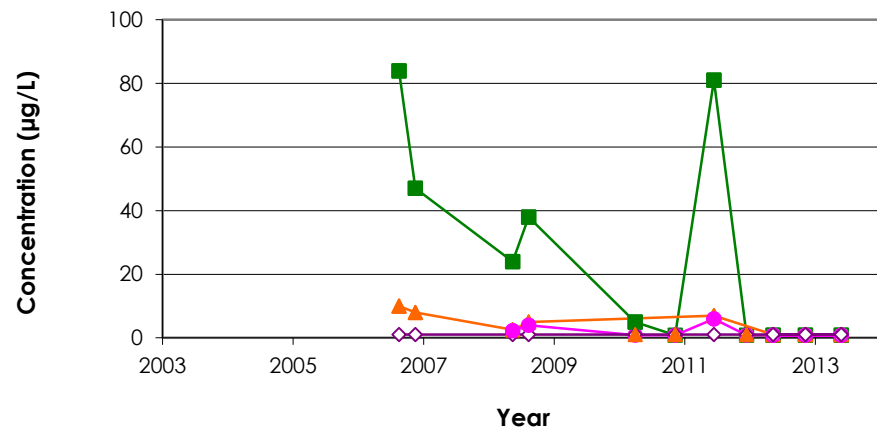
192457.0002.0000

February 2014

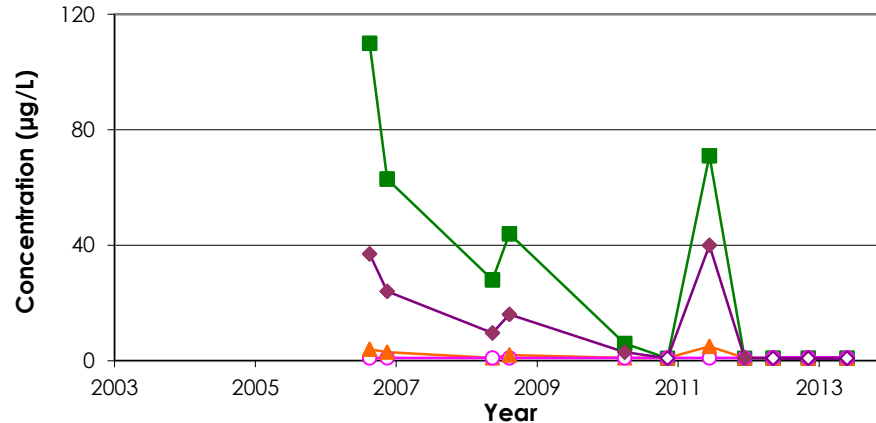
Figure

C.19

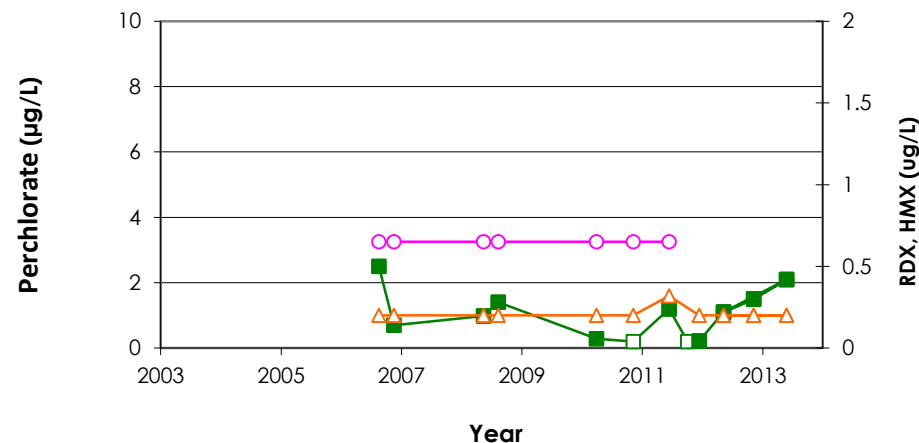
Chlorinated Ethene Concentrations



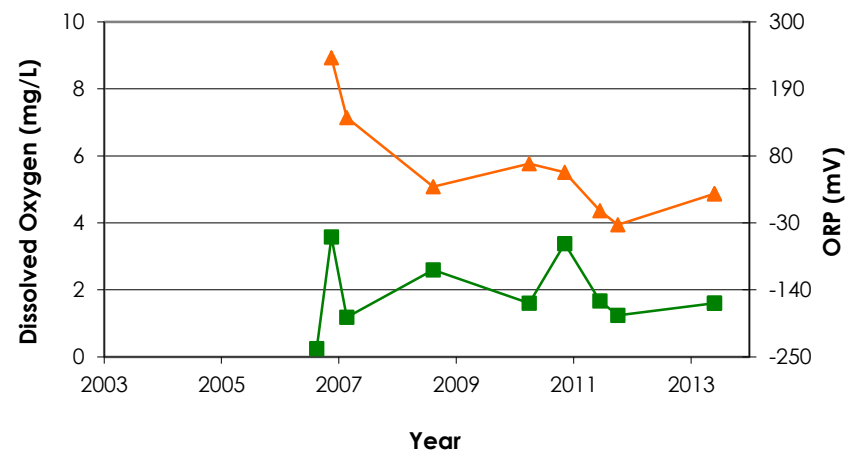
Chlorinated Ethene Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene-line
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW TTU-05

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

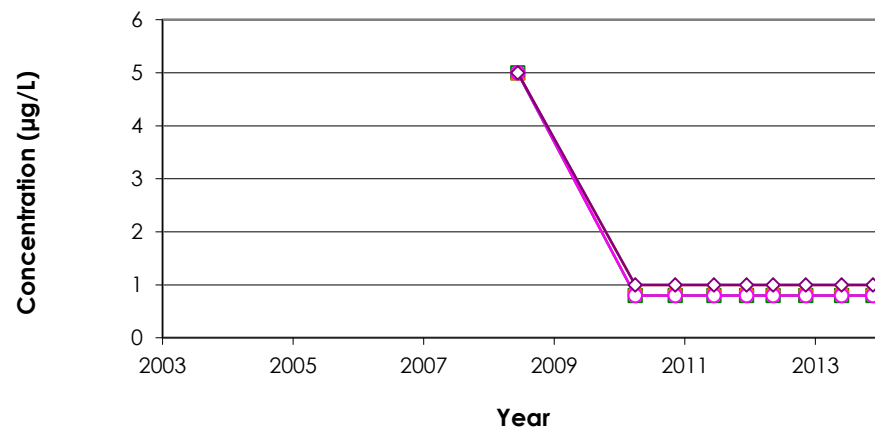
February 2014

Figure

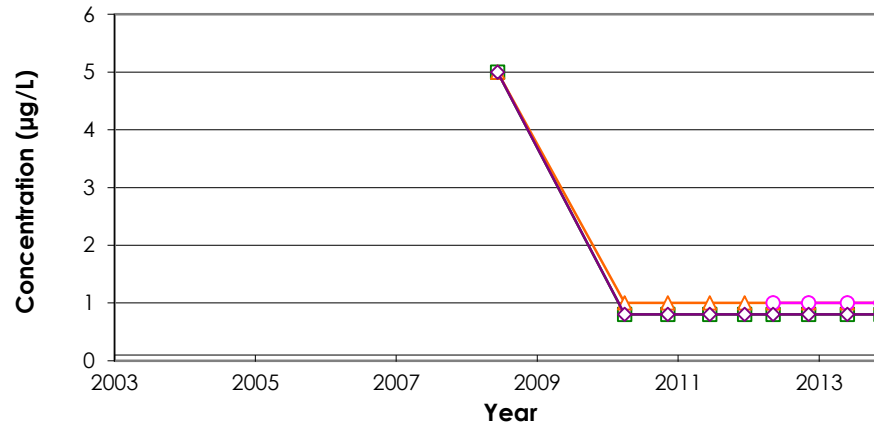
C.20

\\vendima\file\company\Data\VFH\GVT\Projects\Sequa Corporation\192457\0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Slow Time Trend plot-2014-0

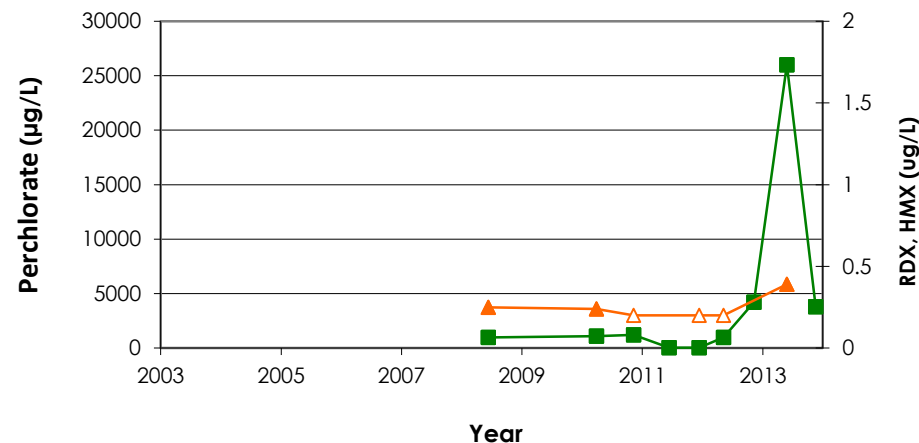
Chlorinated Ethene Concentrations



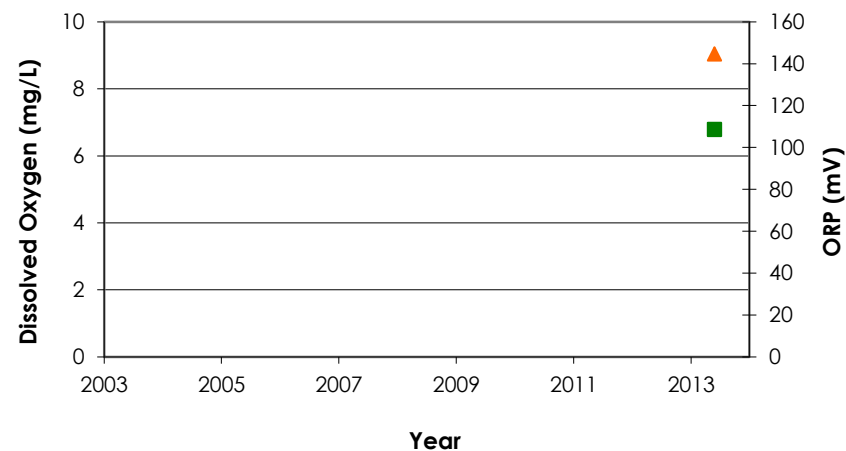
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

**COPC Concentration Time Trends at SW TTU-03**  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

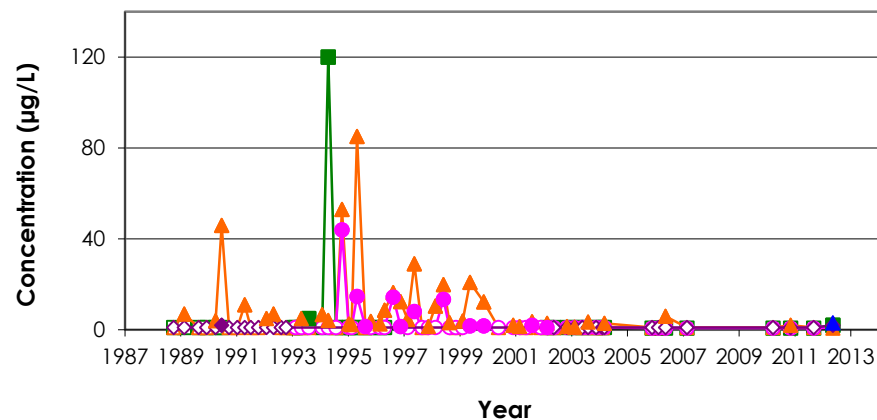
February 2014

Figure

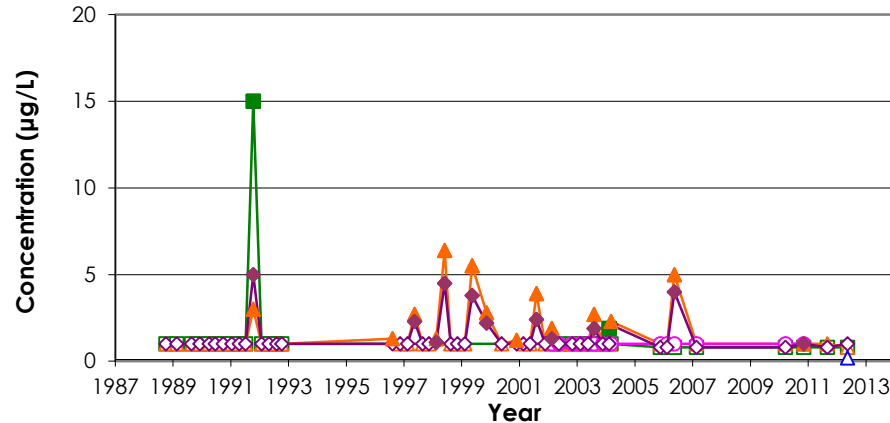
C.21

\\Vencina\h1\company\Data\VFHWG\Projects\Sequa Corporation\192457.0001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Shallow Time Trend plots\2014\_0

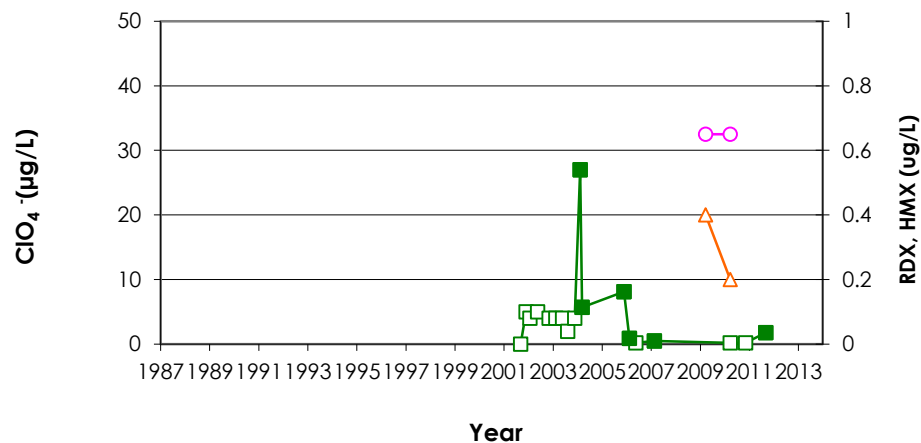
Chlorinated Ethene Concentrations



Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for sampling location.

COPC Concentration Time Trends at STR 02  
Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

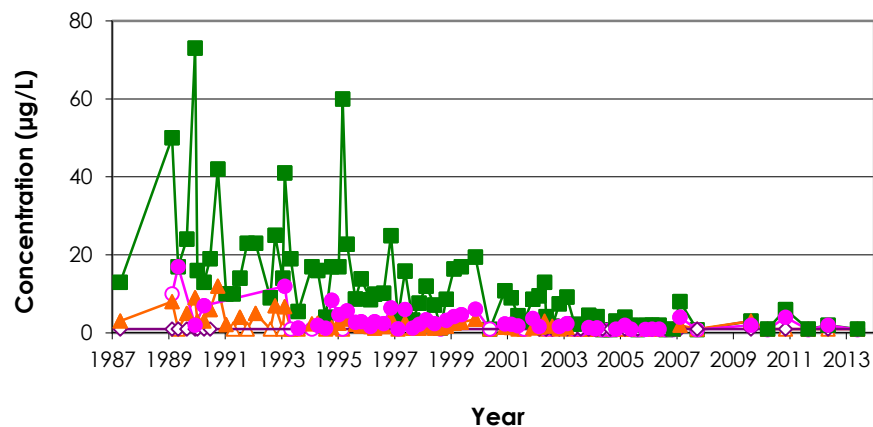
February 2014

Figure

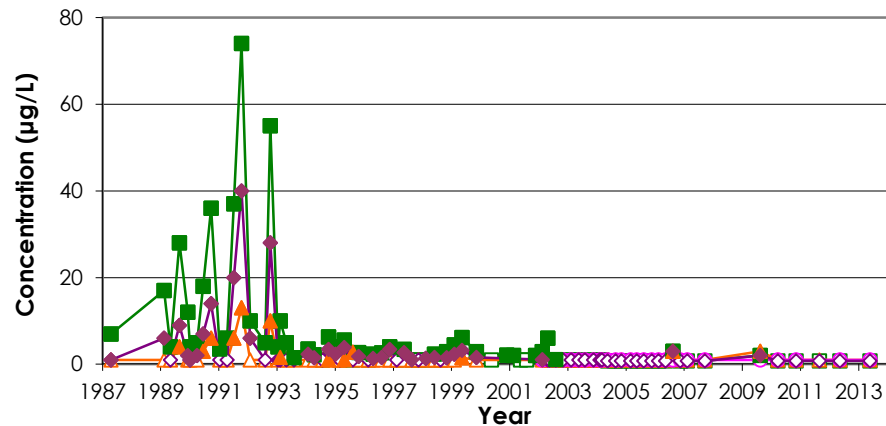
C.22

\\vncinmali-101\company\Data\VFH\MG\Projects\Sequa Corporation\192457\2001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Shallow Time Trend plot-2014-10

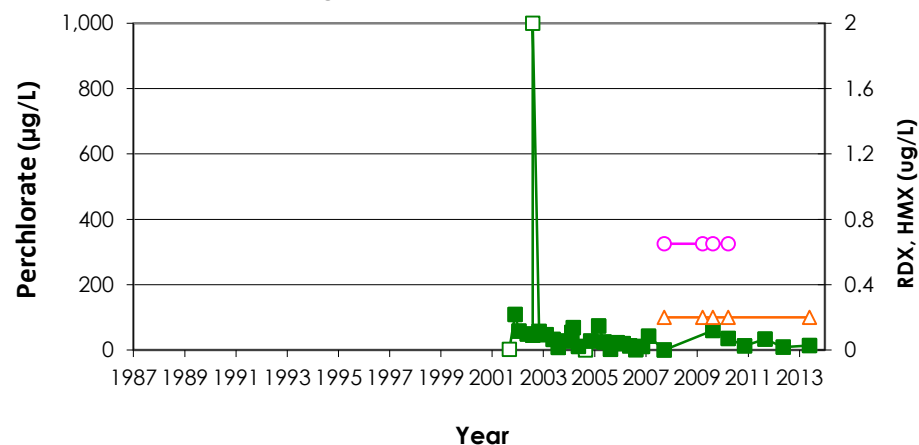
Chlorinated Ethene Concentrations



Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Note: Open symbols represent non-detect samples;  
data values correspond to detection limits.  
See Figure 3-1 for sampling location.

COPC Concentration Time Trends at STR 04

Atlantic Research Corporation, Gainesville, Virginia



192457.0002.0000

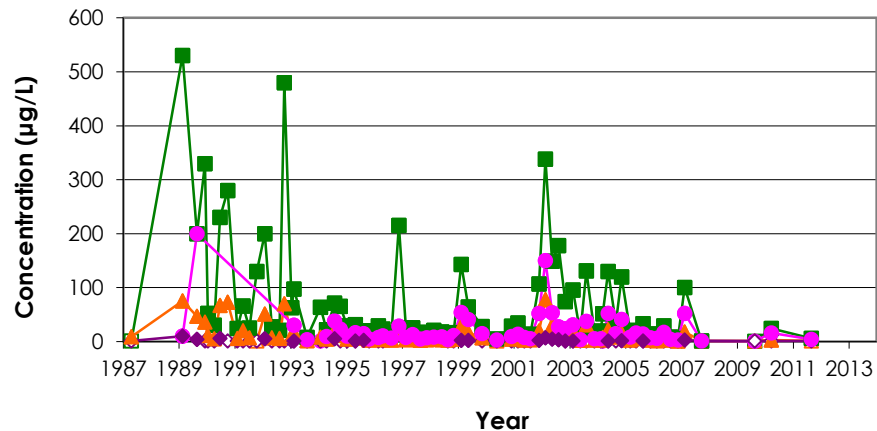
February 2014

Figure

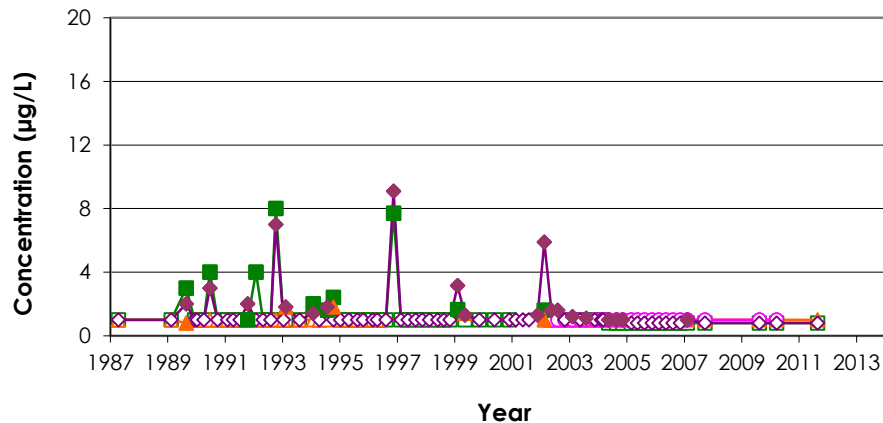
C.23

\\Vendimafile\company\Data\VFH\GVI\Projects\Sequa Corporation\192457\0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix 03\_Shallow Time Trend plots-2014-0

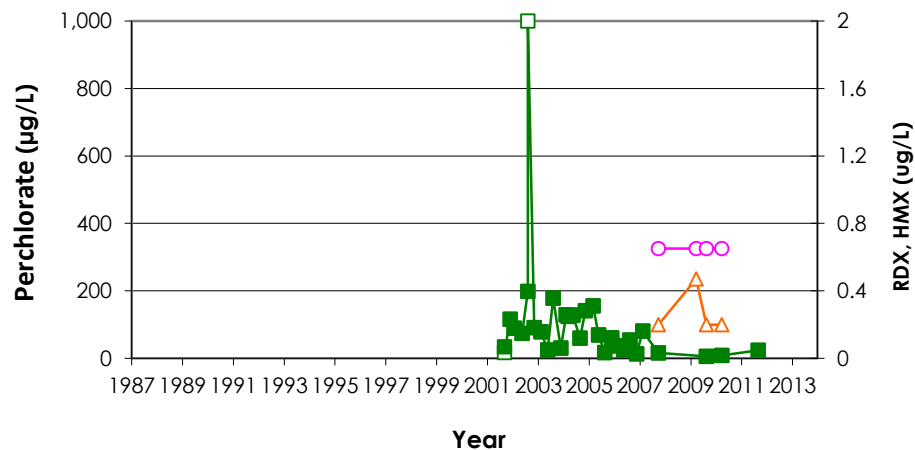
Chlorinated Ethene Concentrations



Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for sampling location.

COPC Concentration Time Trends at STR 06

Atlantic Research Corporation, Gainesville, Virginia



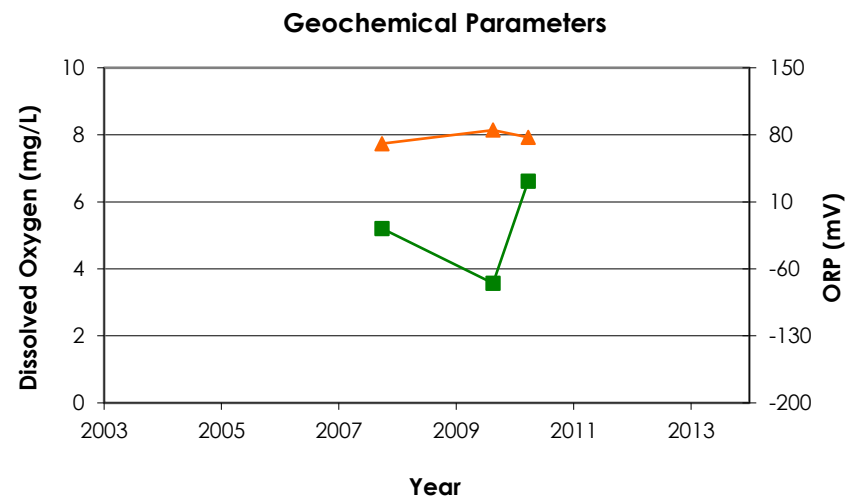
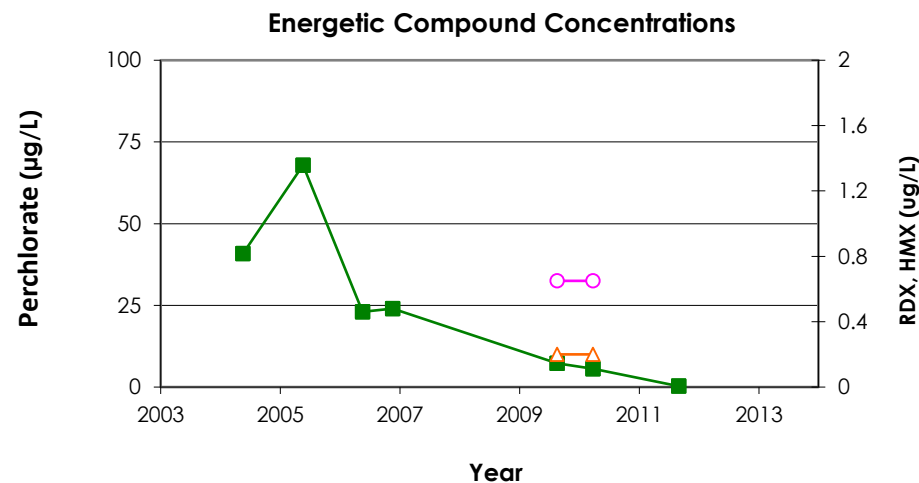
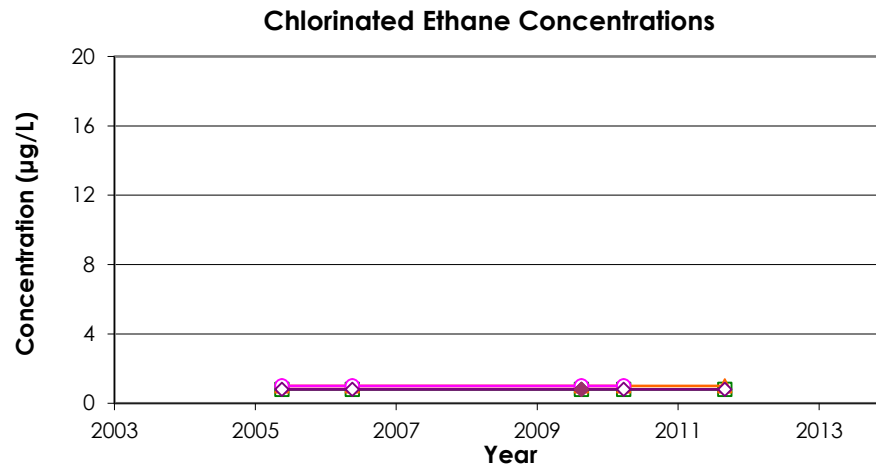
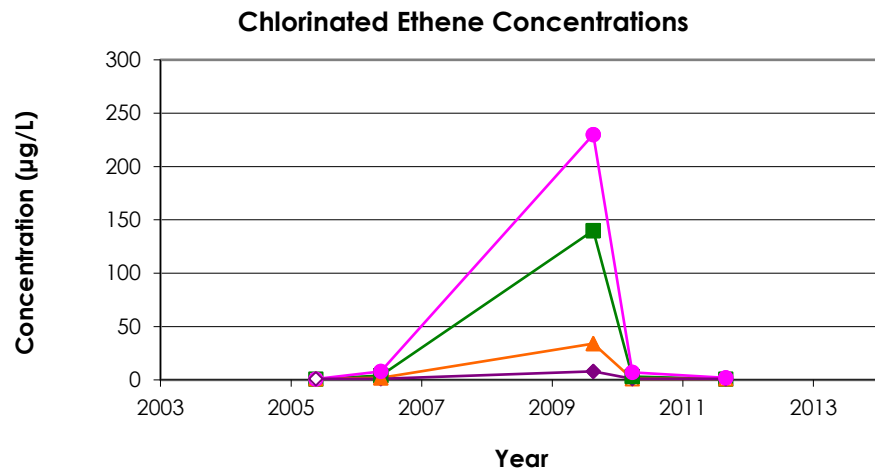
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Figure

C.24

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

### COPC Concentration Time Trends at STR 40-15

Atlantic Research Corporation, Gainesville, Virginia



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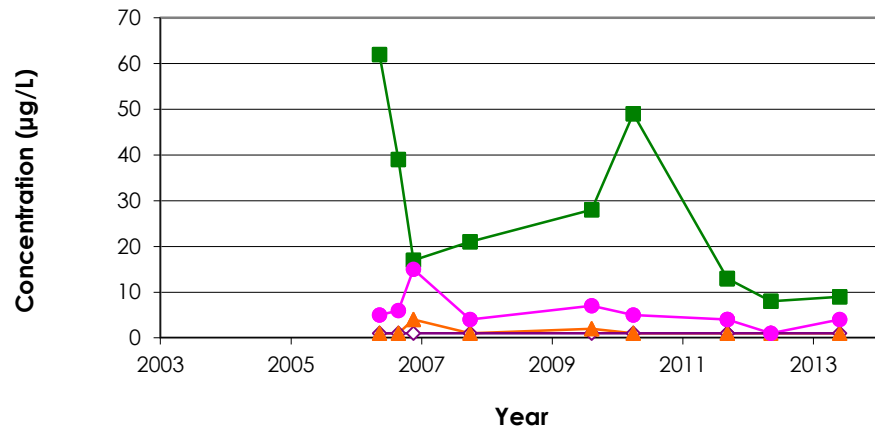
February 2014

Figure

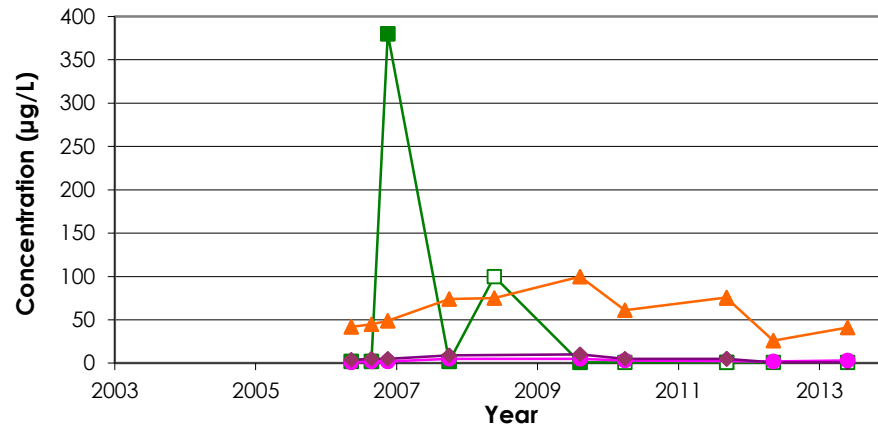
C.25

\\vendima1\p1\company\Data\VFH\GVT\Projects\Sequa Corporation\192457\0001 - Gainesville Reports\2014\_Spring\_Report\Appendices\Appendix 03\_Slow Time Trend plot-20140

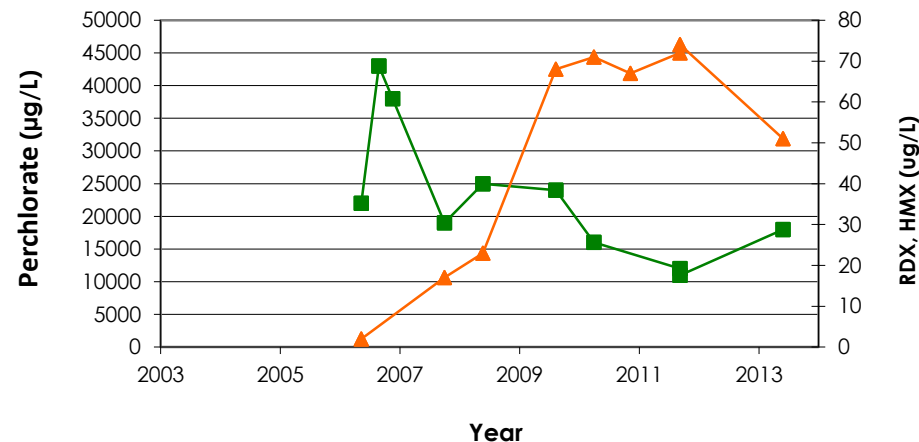
Chlorinated Ethene Concentrations



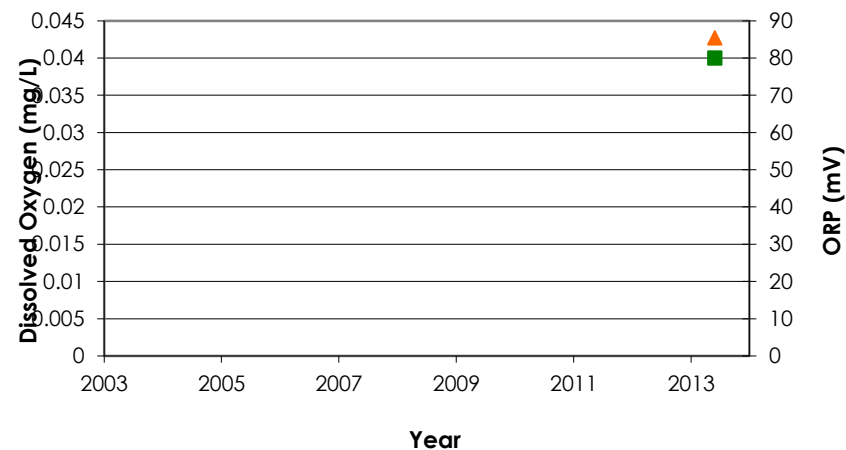
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW CG-01D  
Atlantic Research Corporation, Gainesville, Virginia



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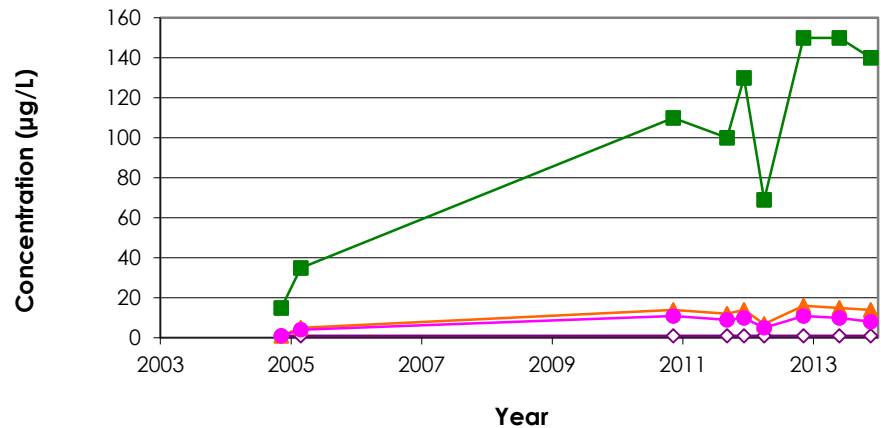
February 2014

Figure

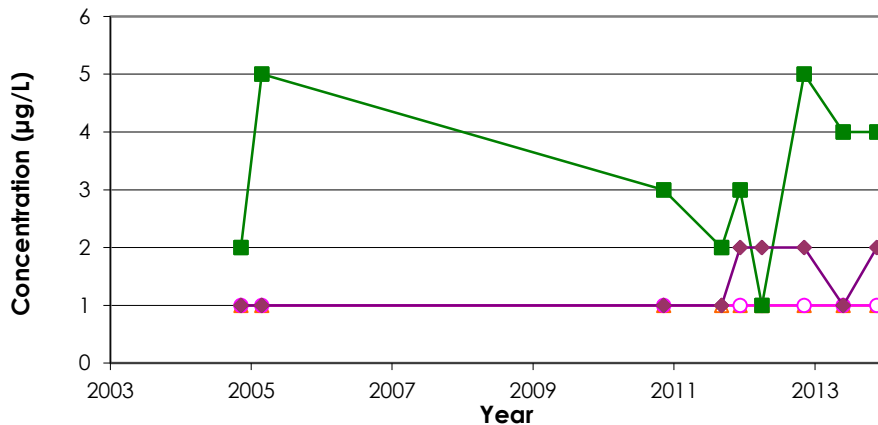
C.26

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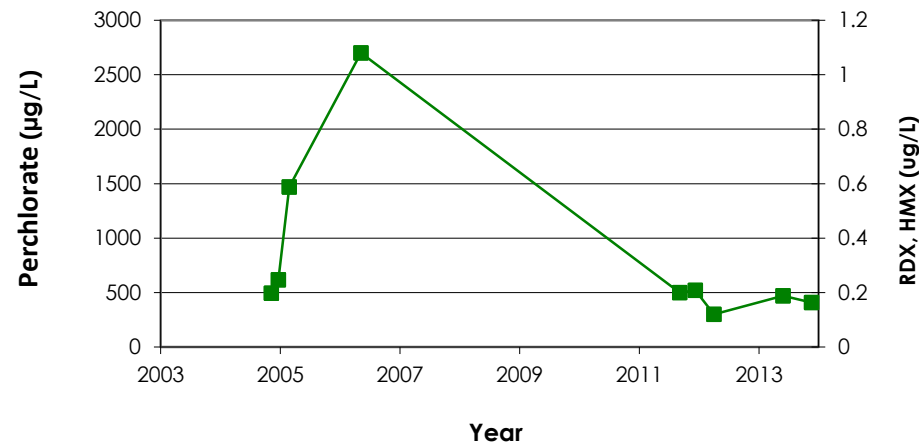
Chlorinated Ethene Concentrations



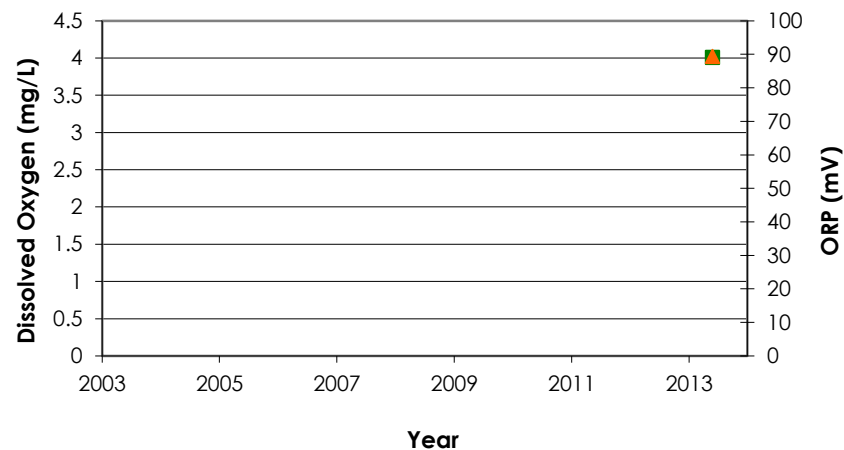
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- ◆ cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- ◆ Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- ◆ HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 5-06D  
Atlantic Research Corporation, Gainesville, Virginia



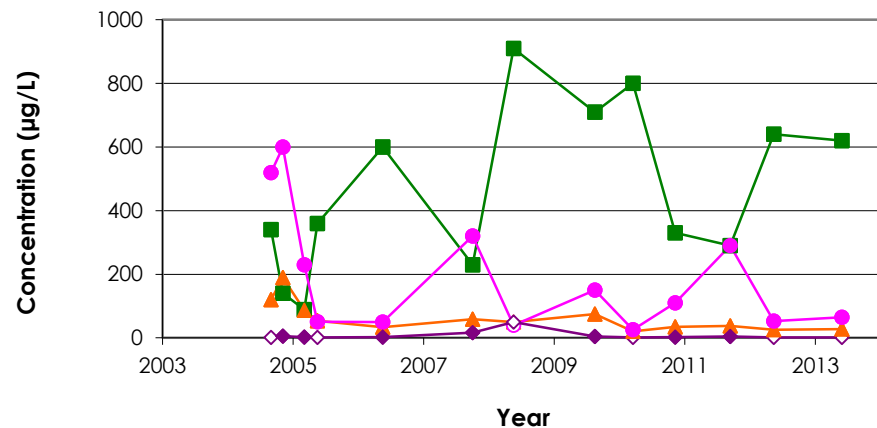
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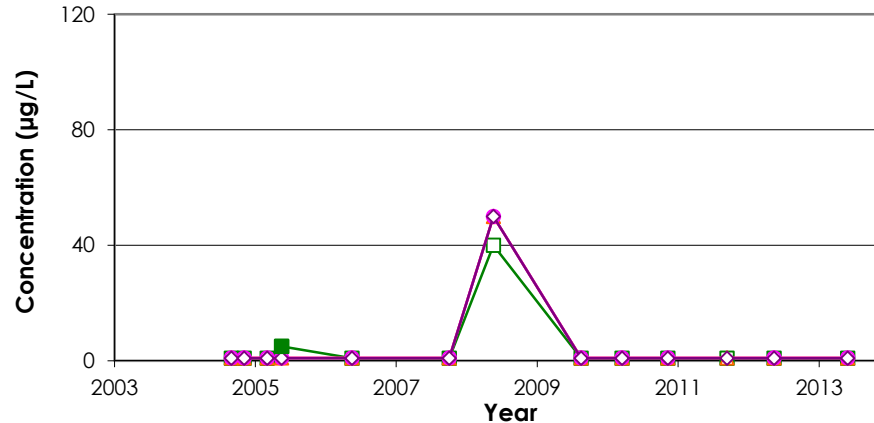
Figure

C.27

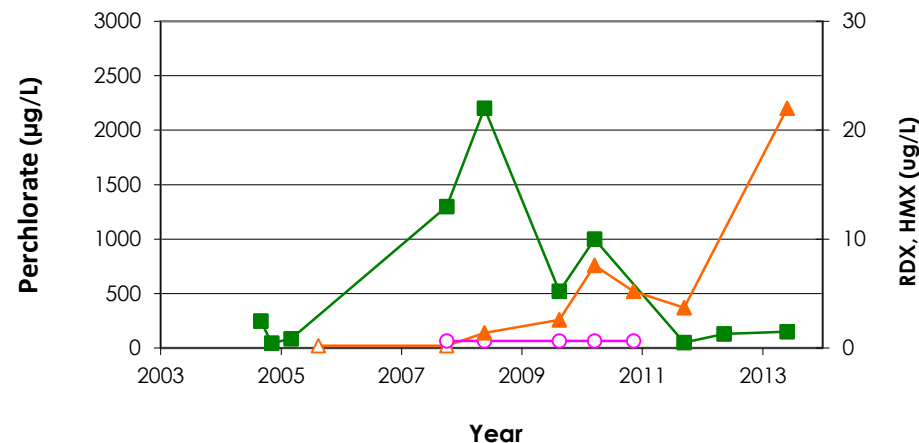
Chlorinated Ethene Concentrations



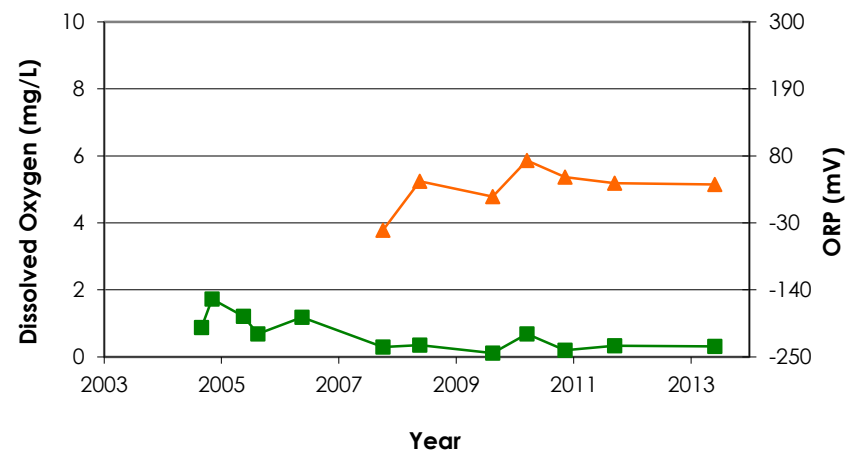
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at SW 74-07  
Atlantic Research Corporation, Gainesville, Virginia



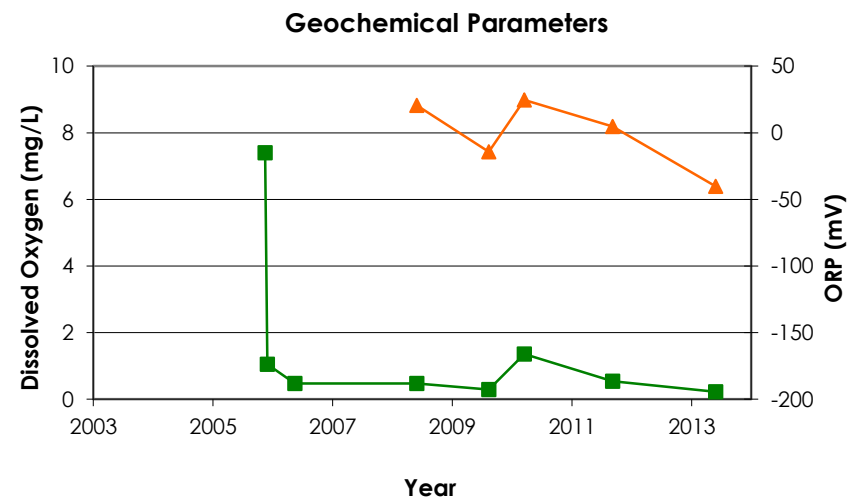
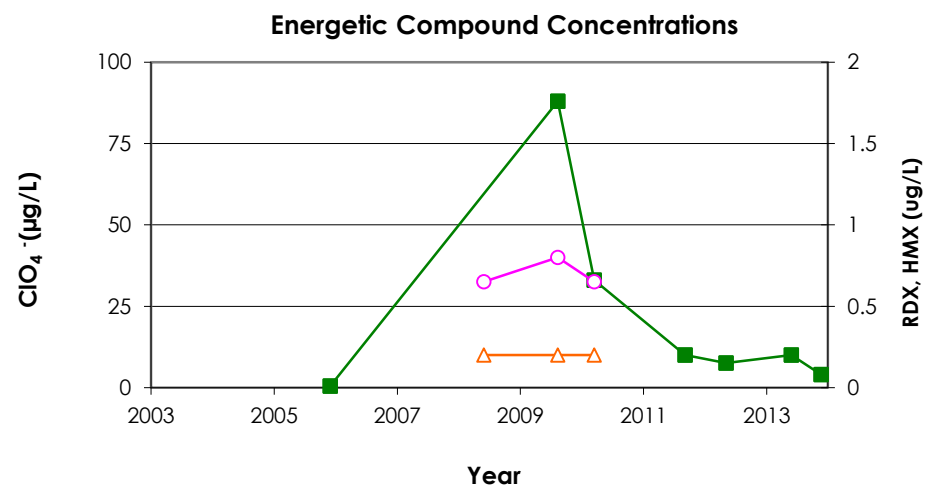
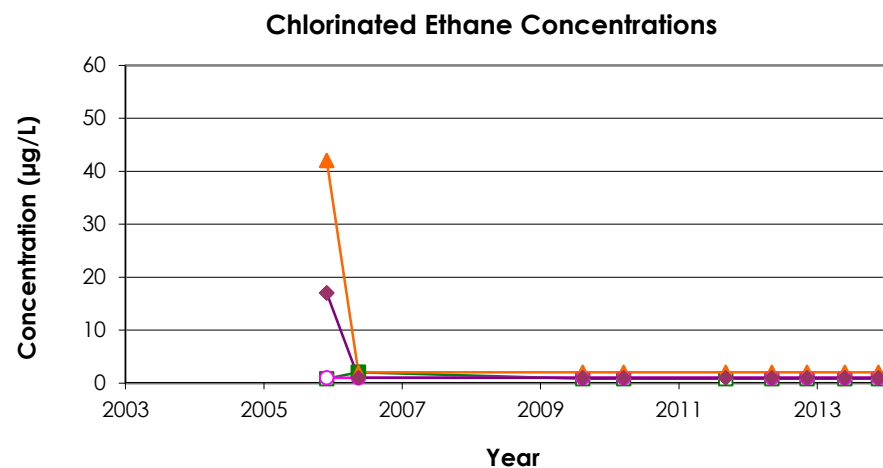
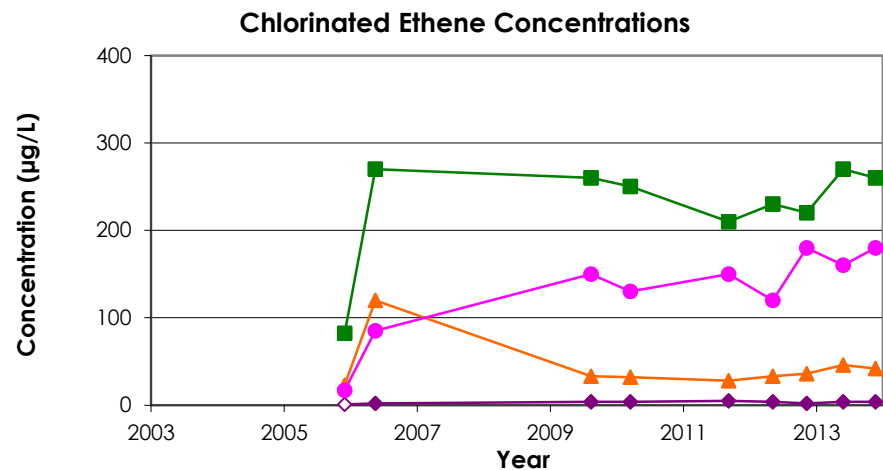
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Figure

C.28

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#### Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

#### Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

#### Energetics

- Perchlorate
- ▲ RDX
- HMX

#### Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

### COPC Concentration Time Trends at BW 45-03S

Atlantic Research Corporation, Gainesville, Virginia



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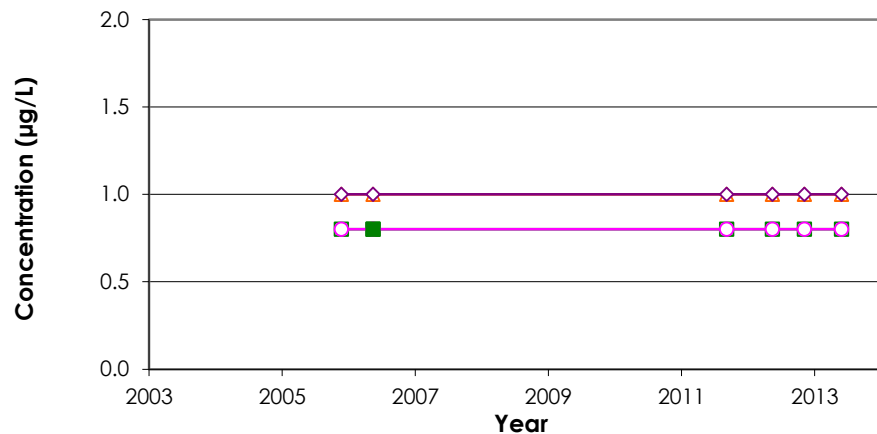
February 2014

Figure

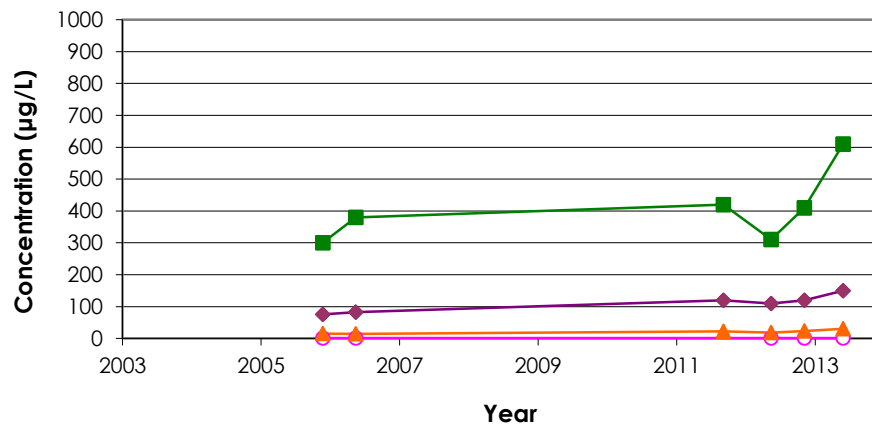
C.29

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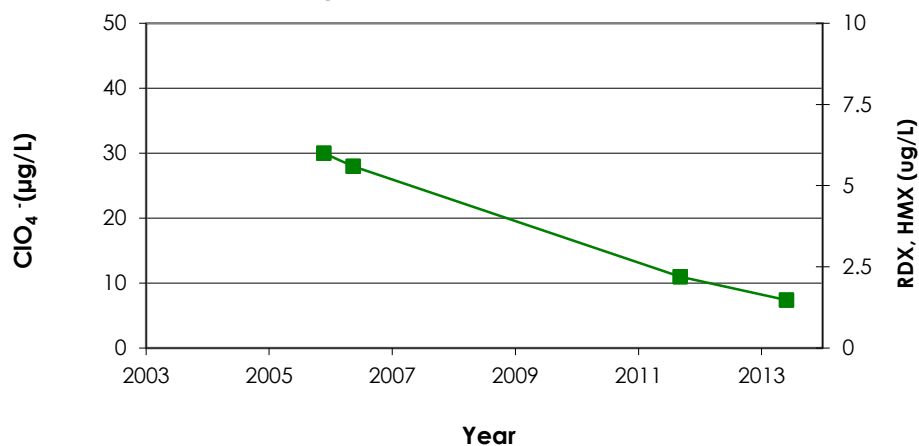
Chlorinated Ethene Concentrations



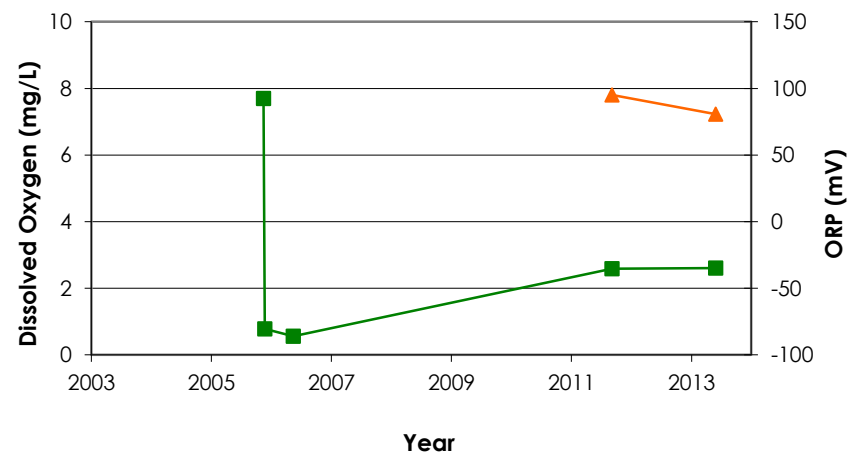
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 79-02S

Atlantic Research Corporation, Gainesville, Virginia



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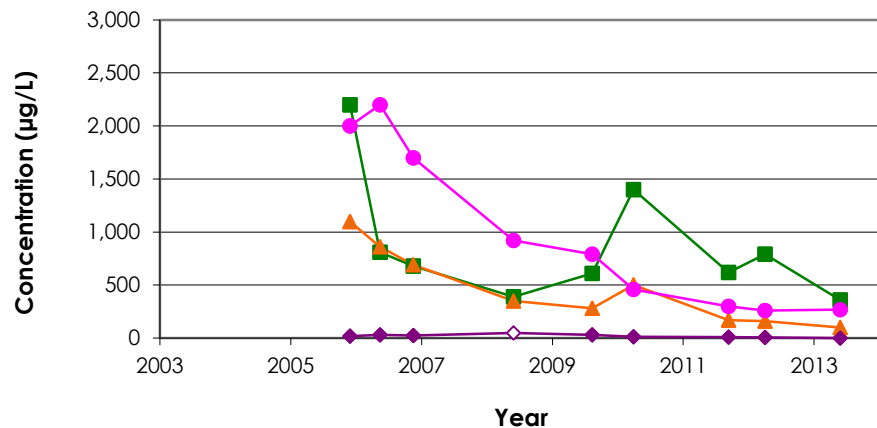
February 2014

Figure

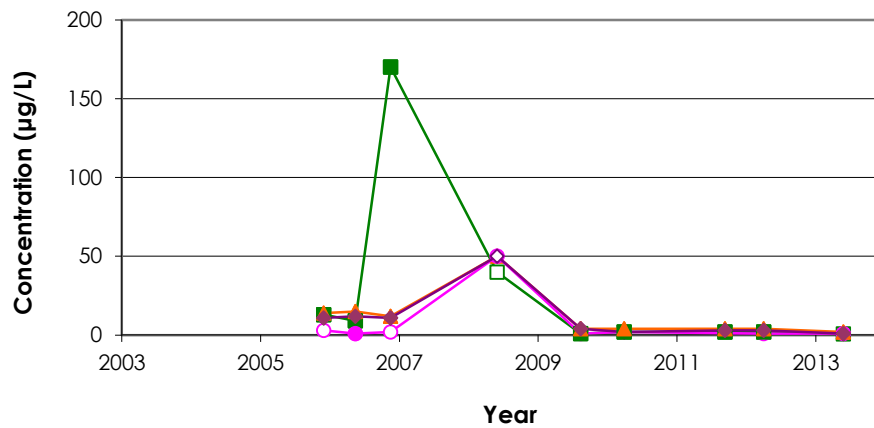
C.30

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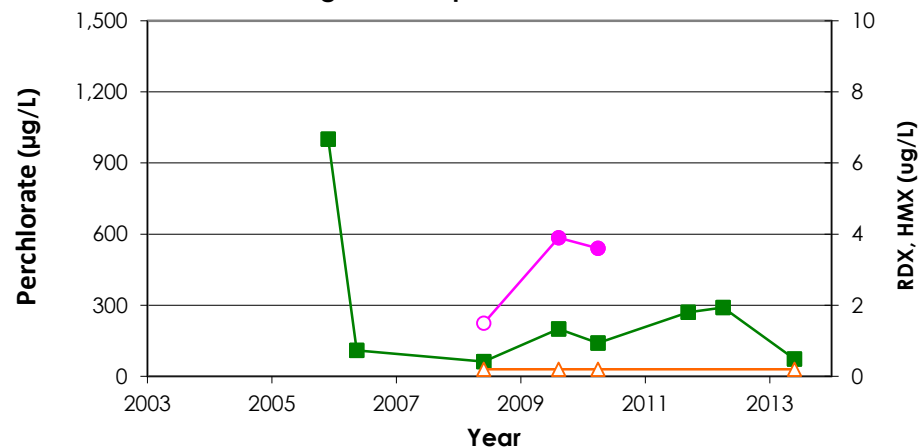
Chlorinated Ethene Concentrations



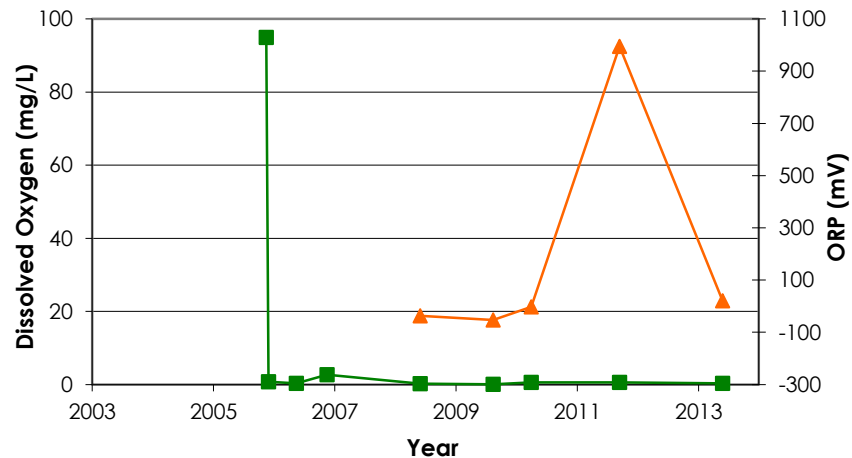
Chlorinated Ethene Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW TTU-03D

Atlantic Research Corporation, Gainesville, Virginia



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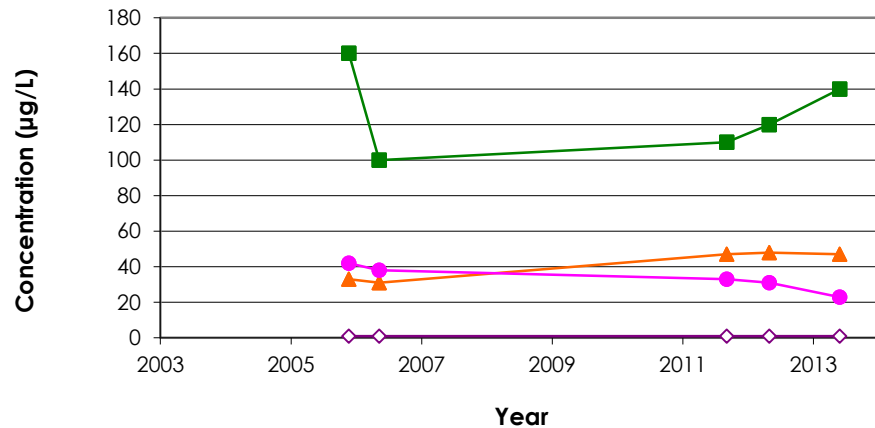
February 2014

Figure

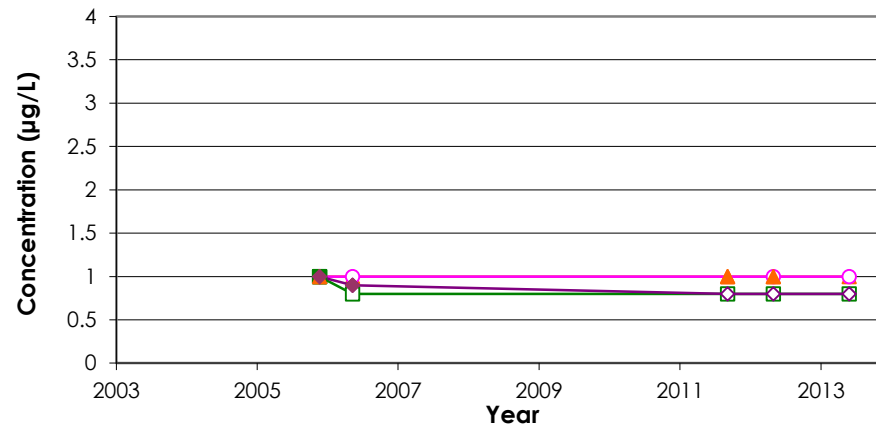
C.31

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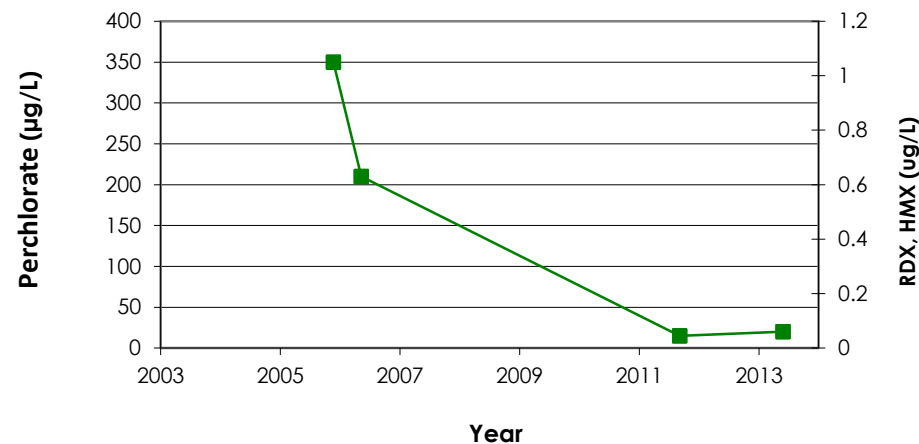
Chlorinated Ethene Concentrations



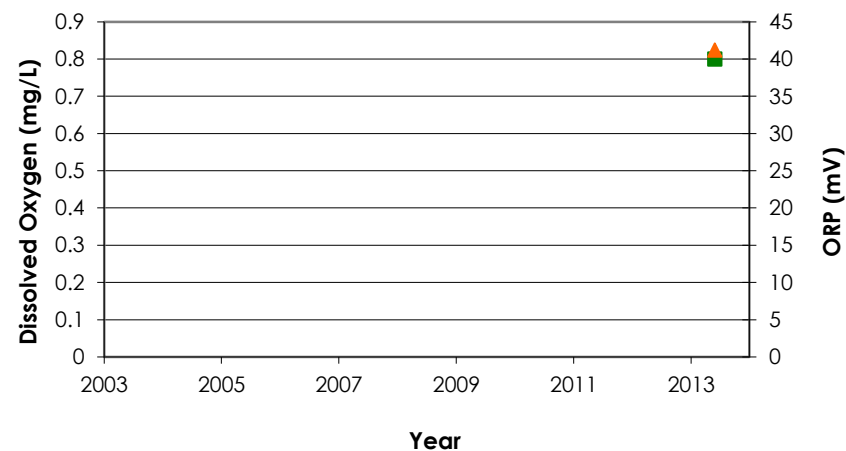
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 31-01S  
Atlantic Research Corporation, Gainesville, Virginia



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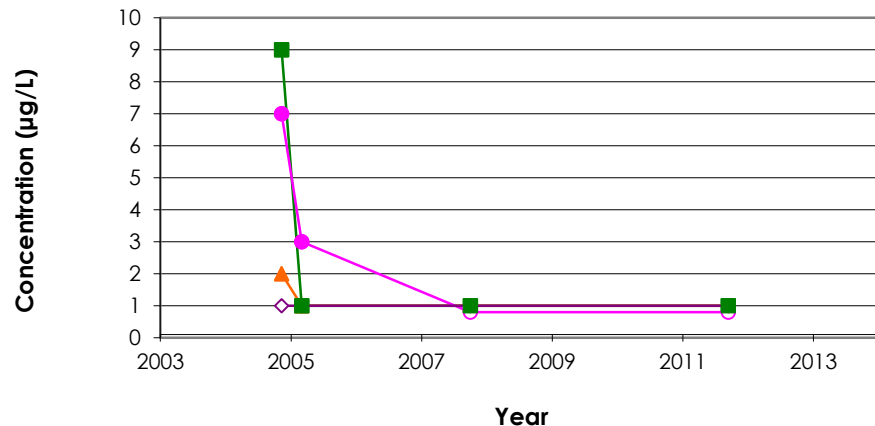
February 2014

Figure

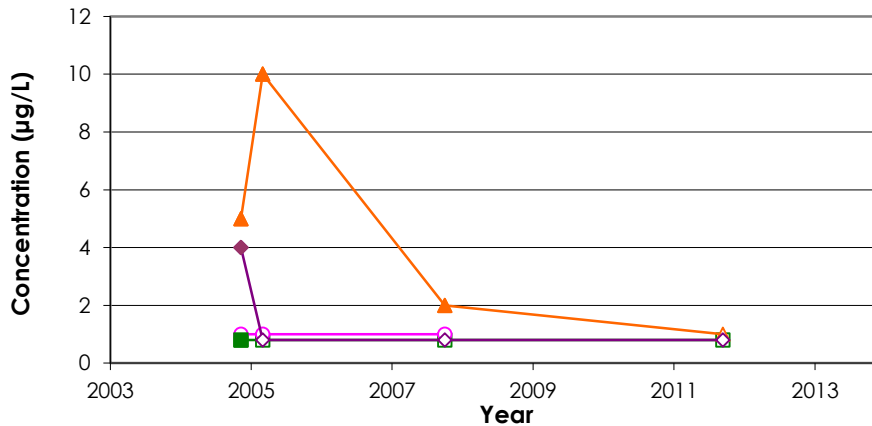
C.32

\\Vendima\file\company\Data\VFH\GVT\Projects\Sequa Corporation\192457\2001 - Gainesville Reports\2014\_Spring\_Report\Appendix\Appendix 03\_Shrallow Time Trend plots-2014-0

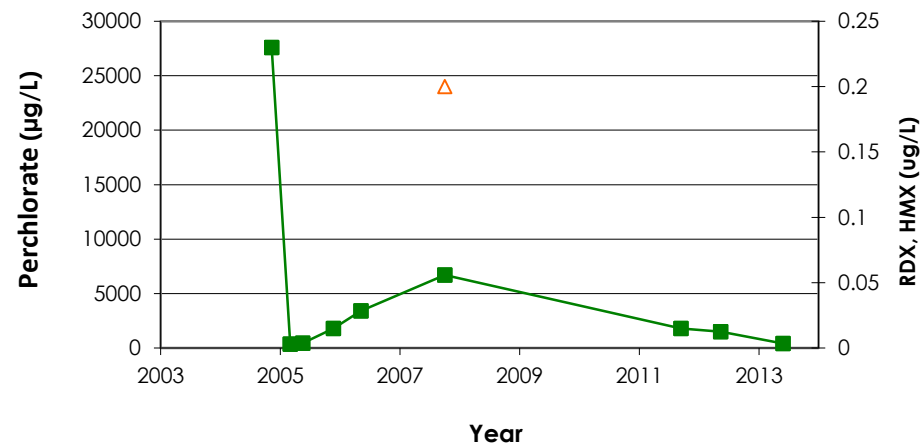
Chlorinated Ethene Concentrations



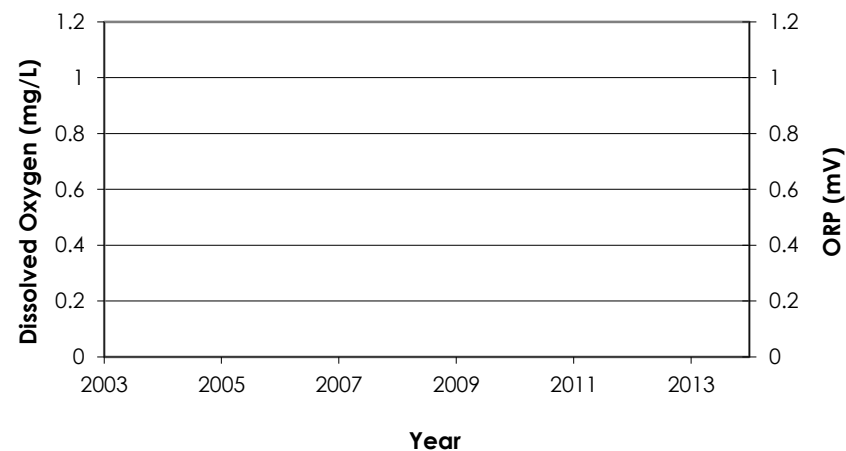
Chlorinated Ethane Concentrations



Energetic Compound Concentrations



Geochemical Parameters



Ethenes

- Tetrachloroethene
- ▲ Trichloroethene
- cis-1,2-Dichloroethene
- ◆ Vinyl Chloride
- ▲ Ethene

Ethanes

- 1,1,1-Trichloroethane
- ▲ 1,1-Dichloroethane
- Chloroethane
- ◆ 1,1-Dichloroethene
- ▲ Ethane

Energetics

- Perchlorate
- ▲ RDX
- HMX

Geochemical

- Dissolved Oxygen
- ▲ Oxidation-Reduction Potential

**Note:** Open symbols represent non-detect samples; data values correspond to detection limits. See Figure 3-1 for well location.

COPC Concentration Time Trends at BW 21-04D  
Atlantic Research Corporation, Gainesville, Virginia



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Figure

C.33